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ON THE PRINCIPLES

OF

HEALTH AND DISEASE.

AN INAUGURAL DISSERTATION

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OF THE UNIVERSITY OF EDINBURGH.

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CLINICAL LECTURE."

> "We oft but skin and film the ulcerous place;
> Whiles rank corruption, mining deep within,
> Infects unseen."
>
> SHAKSPEARE.

LONDON:
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TO

THOMAS STEWART TRAILL, Esq., M.D., F.R.S.E.,

&c., &c.,

PROFESSOR OF FORENSIC MEDICINE,

IN GRATEFUL REMEMBRANCE OF THAT

EMPHATIC PUBLIC COMMENDATION

WHICH,

AFTER CRITICAL PERUSAL,

HE WAS PLEASED TO BESTOW UPON IT

BEFORE

THE ASSEMBLED MEDICAL FACULTY

OF

THE UNIVERSITY OF EDINBURGH,

THIS INAUGURAL DISSERTATION

IS RESPECTFULLY DEDICATED

BY HIS OBEDIENT HUMBLE SERVANT,

DAVID NELSON, M.D.

PREFACE.

It is the ancient custom of our illustrious University to exact from all her Graduates in Physic, an Inaugural Thesis, the tenets of which they must publicly defend. Until within the last ten years, it was also incumbent upon them to publish those Theses; though that is now rendered a voluntary act. The soundness of the old rule, few, I think, will doubt; as it decidedly had a tendency to make men exert themselves on an important occasion, instead of quietly treating it as a mere form appended, by long usage, to the actual business-matter of the examination papers, but not constituting any material claim for the Doctor's Degree. Partly in compliance with what I conceive to be the better, as well as the older system, and partly from a conviction that certain points are herein advocated that may prove, at present, of some public utility, I send forth this Inaugural Discourse, fully persuaded that, under such consideration, none of my professional brethren will deem it an inappropriate mode of introducing myself to their notice, after having been honoured with Hospital and Collegiate appointments so distinguished, and so responsible.

D. N.

9, *Colmore Row, Birmingham,*
March 18*th*, 1850.

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ON THE PRINCIPLES

OF

HEALTH AND DISEASE.

INTRODUCTORY OBSERVATIONS.

Primitive condition of the body.

PERMITTING the imagination to revert to that pristine epoch when man was first introduced into the theatre of creation, we might indulge in sundry physiological speculations regarding that peculiar constitution of body and mind which was meant to be the type and model of all individuals since born. We might attempt to conceive the perfect state of all his organs, their adaptation to each other, and to external things. We might picture a being, the gratification of whose instincts and appetites was duly provided for, and to whom intemperance and starvation were alike unknown; a stranger to jealousy, ambition, and those other social passions which react so injuriously on the frame; his feelings exercised only upon the tenderer affections, and his vivid intellect daily employed in the easy acquisition of fresh knowledge, that highest yet quietest of pleasures, the steady excitement of which, so far from exhausting, strengthens and exalts the mind.

Its subsequent degeneration.

But, as the human family increased, and individuals became the victims of the natural elements, or of their own misguided passions, we may as readily conceive a change in the above picture.

Alterations in the constitution of the blood would be induced by insufficient or unwholesome diet, or by those exposures, or mental affections, which lead to the suppression, revulsion, or perversion of the ordinary secretions. Deranged function would bring about organic lesion. Such lesions would constitute an aptitude to be injured more easily by future impressions. Morbid structure and action being thus permanently established, would acquire a certain tendency to be propagated from parent to offspring, and so lay the foundations of those hereditary evils which are part of the subject of consideration in these pages.

National degenerations.

Such evils, as individual manifestations, are common in their general character, to all communities; but there are collective manifestations which appear amongst whole masses, or groups, of the human race, and owe their existence to meteoric, telluric, or social influences too sweeping and extensive to be controlled by single individuals. Entire families, or classes of people existing under similar circumstances, and possessing originally similar constitutions, must often have migrated into parts, where they were again exposed in common to like influences. This would give rise to those peculiar morbid affections, which in the most ancient records, as in modern times, have been described as characterizing sundry tribes and nations.

Natural tendency to return to primitive type.

But yet it would appear, from all investigation, that as, in the beginning, there was furnished a perfect type or model of humanity, so do the future casts of that model, however mutilated or distorted by untoward influences, still display an innate tendency to return towards that primitive type, whenever circumstances are favourable: and sometimes, Influence of primitive germ on future generations.

even they would seem as if they were not. Whether this be due to a propagated surviving impression, transmitted from the first created germinal microcosm, is a very subtle question. Many are apt to smile at the idea of an acorn or an embryonic spot of any kind containing, within its narrow limits, the undeveloped energies of whole generations: but, as to the apparent impossibility of such primitive germ containing all the future germs, it is no more improbable than the infinite division of the centre of a circle by an infinite number of converging radii; and that there is a secret force, undulating from the remote original to the latest links of the living chain, with a perpetual tendency to expand and improve whatever is shrunken or degenerate, cannot, I think, be doubted. But for the operation of such a force, hereditary national imperfections, once induced, would, by the very law of their induction, go on indefinitely increasing, till all were involved in utter and hopeless deterioration. Yet, ever and anon, noble specimens of mental superiority are seen to arise from the most unpromising stock; and so also the most miserable tribes of savages, under the worst circumstances, will often exhibit amongst their number, individuals of a happy bodily frame, capable of attaining a healthy old age, in spite of their wretched condition as to food, clothing and lodging. The influences that are exerted by any given stock upon distant and future offspring, is illustrated in a more limited manner, by those resemblances that are so frequently observed to exist between living individuals and the portraits of some special ancestors, or still more directly by the striking likenesses of nephews to uncles, or children to their grandfathers

Hereditary qualities.

Unfavourable circumstances modify the developement of the primitive type.

or great grandfathers, while they have none perhaps of the characteristics of their more immediate parents. It is obvious, in such cases, that there was that in the remote stock which, though not developed in the intermediate offspring, was yet propagated through those channels to exert a renewed influence, and be again developed within a more distant, but fitter centre of evolution. The nature of this force or influence cannot be demonstrated, but its reality as an effective agent, is proved by the results. This tendency in adverse circumstances to obliterate the primitive type, and the equally constant tendency of that type to renew itself on every favourable occasion, constitute the two prime arguments of this thesis; the first presenting itself as the grand fountain of all disease, the second affording us the only means by which we can hope to stem its fatal inundations.

These two principles the foundation of Physic.

All nations generally alike.

All countries, however they may differ in special points, have this in common, that the physical constitution of their inhabitants can be brought under the same general classification. This universal classification, which has been in vogue from the most ancient times, consists of the four temperaments formerly considered to have a connexion with the four so-called elements, air, earth, fire and water, but now viewed as mere modes or accidental states of the body and mind, due to the action of long continued causes, difficult to be accurately unravelled. Whatever their origin may be, they are usually now enumerated as the sanguine, the melancholic, the nervous, and the phlegmatic. The sanguine is recognised by its full muscularity, its strong rapid pulse, its fair florid complexion and vigorous cheer-

Of the temperaments.

ful mind; the melancholic by its harder flesh, its slower circulation, its rougher darker complexion, and acute and profound, but less excitable mind. The nervous has thin fibres, a rapid and variable pulse, pale countenance, sharp features, and brilliant eyes, with a penetrating spirit of the nicest sensibility; lastly, the phlegmatic is large and heavy in its contour, but is laxly set together; the circulation is slow and weak, the skin pale, puffy and hairless, and the mind, like the body, is dull, earthly and unexcitable, though sometimes possessed of obstinate courage and slow persevering force. This brief sketch suffices to indicate the general nature of these temperaments. Each of them has its predisposition to certain diseases, as the sanguine to acute inflammations, the melancholic to chronic affections of the organic functions, the nervous to certain fevers, mania or hysterics; the phlegmatic to dropsies, and other cachectic complaints; but none of them seem to be necessarily connected with disease, except in extreme developement. They rather seem to be wholesome varieties, contrived by nature to meet the different calls of society, as it is a notorious fact, that the chief bond of fellowship does not consist in exact similitude so much as in adaptation of faculties. Most persons are of mixed temperament, yet there are always some to be seen exhibiting in a very marked manner the character of some one of the four just enumerated, and there are very few whose appearance does not confine them to at most two of the divisions, as nervo-bilious, bilio-phlegmatic, etc., etc. Rare examples may occur of that happy medium which unites the best qualities of all, and perhaps these examples would be more

Their predisposition to certain ailments.

numerous if society were differently ordered; but on that subject, I shall speak at greater length hereafter: at present, I merely indicate matters of fact.

Extreme developements of any particular temperament may border on disease.

These temperaments, as already observed, are not necessarily connected with disease: but, if they be developed in too marked a form, or if a conjunction of circumstances attack any of them at once, or in succession at their weak points, then they may fall into a state bordering on morbid action, and constitute in the individual an Idiosyncrasy, or immediate proneness to specific disease which, indeed, may almost be designated disease itself. It is, at least, one part, (and that not the least important) of the event that ensues on the application of a poison, or other injurious agent. Indeed, it almost seems as if a perfectly healthy body were not susceptible of any impression from certain agencies, otherwise deadly. No one fails to observe that while the effects of real poisons are constant and invariable, those of miasms and the like are only conditional.

A happy mixture repels diseased action.

While one portion of society is annihilated before the march of a pestilence, another walks unhurt amid its thousand arrows, unconscious even of their existence, except by the myriads of victims that lie prostrate around. There must be efficient causes for such liability or such exemption; and if we knew these causes more, we would know the diseases less. Prevention, according to the ancient saying, is better than cure. An inquiry into such causes, certainly goes directly to the point, and ought to be pursued with more diligence than any other subject, except it can be satisfactorily proved that it is a matter utterly beyond our natural abilities.

Objections to primitive type being a perfect one.

I am not unaware that a doctrine has been advanced totally at variance with this idea of the perfection of the primitive type, a doctrine that declares the lowest races of men to be representatives of the original stock, while the higher are specimens of the improvement that can be effected by artificial appliances. Not to meet this with any higher argument; but only on the ground of natural history, it appears to be fraught with great improbability. Indeed, before such an assertion could be agreed to, it behoves its supporters to bring forward a better array of facts, and a closer chain of logical reasoning than they have yet vouchsafed to do, considering that the opposite opinion has been that of the general philosophical world in every age; an opinion founded, not merely on vulgar tradition, or the imaginative flights of the poet, but on the solid ground of abstract truth. No one now questions but that all the human family are of one species; a fact settled by the productive offspring resulting from any two intermixtures. This fact carries us back to one common stock, and that that original stock was of a perfect nature, is proved by another fact that prevails everywhere in nature, viz: that a higher power cannot emanate from a lower one; in other words, no one thing can convey to another that which it does not itself possess. The prototype may degenerate under unfavourable conditions, and be revived again as soon as the favorable conditions are restored, (a fact proved by daily observation:) but it has never been proved, nor do I believe it could admit of proof, that any prototype of essentially defective energies could afterwards assume those energies to itself by the mere happy appro-

The objections considered and rejected.

priation of the inorganic elements under the influence of heat and light. This would be to make these elements and influences the constituents of the vital and intellectual principles, and not the mere conditions of their manifestation; a conclusion rejected by all the best metaphysicians and physiologists. Under this conviction, I shall therefore, continue to hold the doctrine on which I first set out.

Does not affect human constitution in the abstract

But indeed, such questions as the above, rather apply to the various special races of mankind, than to man in the abstract of whom I am properly treating. It is not my intention to indulge in any speculations regarding those external or internal peculiarities, which, however they may distinguish nation from nation, in anatomical form, do not interrupt the essential physiological functions of our common nature, or interfere with what we call health.

Limitation of the definition of disease.

I only intend to speak of external agencies as they injuriously affect the human frame, and of the human frame in its morbid actions or tendencies. It may be considered, indeed, that all changes, however diverse, are, so to speak, mere sports of nature, so long as they consist with the capability of a ripe old age, after a life of cheerful activity of mind and body, and of freedom from pain. Such changes are lesions of nature, only when they lead to contrary effects.

Broad meaning of the words health and nature.

When, therefore, in the following pages, man is spoken of as conforming or not conforming to nature, it is not to be understood in any confined or empyrical sense, with regard to any one condition of food or clothing, or degree of civilization; but in a general sense of adaptation to circumstances. Least of all, is nature to be spoken of as opposed to art? for, without the least affectation of indulging in paradox, I think it may be safely averred that art is natural to man. In his less advanced states, he has, in common with brutes, many instincts to guide him through life: nor do they leave him after the cultivation of his reason, though they become modified. The distinction of primary from induced wants then becomes a matter of nice discrimination, though both be good according to circumstances. Wisdom must strike into the medium path. Many instinctive wants or desires are certainly the great means towards health and personal safety; and are in many instances our chief guides. The neglect of them often leads to the worst results. Persons who live too much according to fanciful principles, and despise these natural monitors, generally suffer for their folly. Eating, drinking, or resting according to such invariable rules is to be deprecated. Nature, it must be admitted, should guide us; but it must also be admitted that it often requires a natural philosopher to decide what nature is, and what are her real demands, courses, and capabilities. These are indicated in a general manner by the principle above stated, viz:, their consistence with the longest possible life, accompanied by the greatest activity, and the least pain.

Natural instincts guides to health.

Difficulty of distinguishing natural from artificial wants.

The legitimacy of wants decided by the results of their gratification.

In undertaking to review such a very extensive and abstruse question as this, I painfully feel my inadequacy to the task. Definite principles could only be arrived at after years upon years of patient and dispassionate investigation. The present thesis is advanced only as the expression of a few suggestive thoughts arising out of the contemplation of some scattered facts, and as an earnest, that the author's mind is fully alive to the grander objects of his profession, however slight his ability to carry them out. This must constitute his apology for choosing the subject, and for handling it so inefficiently as he feels he must do.

Four heads of the present argument.

To reduce so diffuse an argument to some definite shape, it will be as well to divide it into certain portions, which may be as follows.—

Firstly. Considerations on the conditions of health.

Secondly. On the agencies which induce disease.

Thirdly. On the reaction of the vital powers against those agencies.

Fourthly. On extended modes of enquiry and management which might tend to diminish the ravages of disease.

Introductory physiological remarks.

Before entering upon the special conditions of health, it may be right to allude to one or two general physiological laws which govern the actions of the body. Both body and mind are endowed with the faculty of receiving and appreciating impressions from the external world, and are forthwith moved to respond to those impressions by certain movements or affections on their part. This is the principle of reaction, which in its character is essentially vital. There is nothing in the range of chemistry or physics that can be at all compared with it; not that I am unprepared to admit the all important part which chemistry plays in the laboratory of the living system; for I do not believe that any change ever takes place in that system, without some alteration in the arrangement of its atoms. But I should desire also to hold that that force, or combination of forces, which has been named the vital principle, is not a mere result of certain physico-chemical arrangements. It is very certain

Vital forces their supreme sway

Mutual dependance of the vital forces, and the chemical affinities that, without these specific arrangements, the vital principle cannot be manifested; but it is likewise certain, that without the vital principle, these specific arrangements cannot be made. They are mutually dependant upon one another. The one does not proceed from the other, as an effect from a cause, but they exist in the organic being as coincident necessities, as two and two in the complement of four, or acid and alkali in a neutral salt. But, as the particles of the body seem to have a perpetual tendency to return to the less complex forms in which they originally existed as unorganized elements, and to escape from the circle of life and from that peculiar chemical action which prevails within it, so does vitality seem to maintain a constant struggle against the operation of ordinary physics and chemistry. Some have decided this as absurd, and arrived at an opposite conclusion by following a different train of arguments. I merely mean to indicate, that as soon as what is called life is withdrawn, there follows a total dissolution of the frame according to the ordinary action of those natural laws which life had hitherto resisted. That the phenomena of life are not merely the result of organization, and that the organization and life are not affected by chemical agencies alone, and by way of material absorption, is obvious from the effects produced by a look, or by a mental emotion, or the mere remembrance of an event. We also know, in external nature, that it is not matter, as matter, that acts; but certain inherent forces, which we name laws. Matter is, as it were but the husk of nature, a powerless mass, but for those impulses, principles, or whatever they may be called, which are altogether

on one another, yet distinct in their respective natures.

All matter subsurvient to its inherent principles.

invisible to sight, but not the less appreciable by the understanding. In like manner, we recognize a distinct power exerting its energies within the body, and moulding other forces to the attainments of its own specific ends. With these views, we may logically enough speak of instinct as having two modes of manifestation. For if we define those acts to be instinctive which have ends in view, but yet are not ruled by the intellect, then we may admit an organic as well as an animal instinct: the latter comprehending all those acts of which we have a mental consciousness, the former those of which we have none, namely; the functions of nutrition, secretion, and the like. Mechanical forces, though they must coexist with these powers, seem only to be subordinate to them. We must recognize in all such acts and operations a presiding principle superior to mere physical laws, and governing the frame with, I shall not say a perception, but certainly an application of chemical and mechanical forces far beyond our own reason: so that we need not be surprised at animals unconsciously performing works of the greatest apparent skill, while we find a similar agent within our own bodies effecting miracles without our knowledge.

Organic as well as animal instinct.

Its operations indicated.

But while I recognize the amazing and subtle influence of the vital principle, I must repeat my conviction that, as it is invariably connected with a physical framework, so are its manifestations influenced by the condition of that framework, while the state of the framework itself depends generally upon chemical action. Even when emotions of the mind destroy the body it is usually in a secondary manner by the intermediate induction of chemical changes in the constitution of the nutrient fluids. Cases occasionlly happen in which a sudden passion instantly paralyzes the heart; but these are by no means common. Death therefore, in an overwhelming majority of persons, arises from physical changes effected by physical agents, and I have only dwelt at length on the existence of the vital principle, in order to avoid misconception, lest, in advocating the cultivation of a chemical treatment of disease, I should be supposed to view the animal structure, as a common chemical apparatus, instead of a living laboratory, altogether peculiar and mysterious in the minuteness, complexity, and multiplicity of its combinations. There is only this fact to be borne in mind at the same time, viz: that the original imparted living principle is the essential mould, idea, or type from, and by which the material expression is developed; that idea not really, though apparently shrinking or expanding, or deteriorating, or improving according to the arrangements of atoms, or the diverse influences, amid which it has to act.

The body a living laboratory.

Its operations moulded or influenced by the spirit of the primitive type as well as external forces.

Subject to the vital principle, we find the whole round of nutrition, that is, digestive assimilation, disposition, absorption, and excretion. While all these are duly balanced one with another, and are not burdened beyond their powers of reaction, then health is maintained. As soon as the contrary occurs, disease ensues of greater or lesser amount according to the circumstances. Hence arise excess, or diminution or perversion, of the nutritive processes; from the first, come all hypertrophies: from the second, atrophies: and from the third, those deposits which are either simply misplaced, as fat in the liver or kidney, or non or caco-plastic deposits, as pus, tubercle

The nature of its operations.

or encephaloid. Disease may occur, as already observed, and even end in death, without any appreciable change in the structure of the body. In such cases there is either a minute absorption primarily affecting the fluids, or else a shock, be it material or immaterial, so reducing the nervous energy that it is not capable of any effectual reaction.

Conditions of vital operations.

The chief conditions on which the performance of these processes depend, are a certain degree of heat, moisture and light, a due supply of the essential elements in certain specific forms of combination, whether as food or air, and an equable state of mind, in which it is neither elevated nor depressed beyond self-control. To these might be added a negative condition, the absence of hurtful agencies; but all of them do not seem to be invariably hurtful, except there be predisposition, or their action be so powerful, or so oft-repeated, as to overpower the principle of reaction. Reaction in the healthy subject, will generally be equal or rather superior to the exciting cause, but as there are extremes of sudden assault, which sometimes annihilate it at a stroke, so there are other extremes of slight and almost imperceptible injury which accumulate by slow unceasing action, till it sinks under the hopeless weight, with only a hectic, and expiring effort. Such is the simple history of chronic disease. If, at its beginning, the constitution had either been more sensitive, or the irritation a little greater, reaction might have produced an acute type, and so terminated the disorder. In the moral world, we find that an overwhelming hostile force crushes the mind under despair; against a lesser evil it contends with hope, but a prostration, quite equal to that of the first cause, may be induced by graduated small encroachments; trifle after trifle is yielded, till the victim becomes incapable of resisting his habit of submission. The organic life seems to furnish an analogous mode of action. Under the first degree of attack, we have little hope from any treatment; in the second, we have to modify the efforts of nature by tonic or antiphlogistic means, according as these efforts may be under or above the occasion: in the third, we have either to excite efficient reaction, or remove the insidious cause.

Heat.

Heat, as already stated, is an essential condition of life; but health is always deranged whenever it is supplied either too scantily or too largely.

Nature has kindly permitted wide grades of the thermometer to be consistent with health and comfort; but though the constitution has wonderful powers of adaptation to surrounding temperature, they are not of instantaneous operation. The transition, to be innocent, must be gradual or moderate, never sudden or excessive. The effects of abrupt movements from heat to cold, or of either heat or cold in extreme, or too long continued, are very familiar. The consequences of change of climate are likewise well known in the affections of the liver etc., which persons from temperate zones are subjected to under the tropics, and in those pulmonary and tuberculous attacks to which the intertropical races are peculiarly liable when in cold countries. There can be no doubt that moderate and frequently practised transitions have a decidedly tonic effect, and they may even be beneficial in extreme, provided they be of brief duration. It is under this condition that the alternate influences of hot and

Effects of redundant or deficient heat.

cold water are submitted to in Russia and other countries with impunity. But the dashing of a vessel of iced water over the body on emerging from a warm bath, and then immediately scrubbing the surface with rough dry towels, is in reality no illustration of the effects alluded to. We have here only the impression of cold, and little more. The reduction of temperature can be but short and slight. Were the patient left to dry by the process of evaporation, and in a state of inaction, the results might be very different. The tendency of habitual exposure to cold, especially when accompanied with deficient diet, to induce the tuberculous diathesis, is now fully established. The extent of my subject does not permit me to enter into details illustrative of the fact; I shall only venture to advance the general proposition that I believe that diathesis to result in such cases, from the exhaustion of nervous power, consequent on protracted and ineffectual efforts to produce an extra supply of internal heat, from a minimum of material, and that this exhaustion leads to a diminution of the red globules, and the deposition of suborganizable fluids. Pathologists declare that they find every gradation of quality from pus to tubercle. It therefore seems, as I have ventured to state, not a specific production, but only a modification of lymph degenerated under a diminution or negation of the vital, or nervous energy. Comparing the similarity, not to say identity, of this tuberculous deposit with that of typhus, and contrasting the fatal persistency of the first, with the temporary existence of the second, we are naturally led to attribute their resemblance to the one common cause of diminished vital power, and their dif-

Cold. Its tendency to induce tuberculous degeneration.

Tubercle may be temporary or persistent.

ference, in point of persistence, to the chronic organic atony of the diathesis on one hand, and the essentially temporary prostration of the fever on the other. The experiments which Jenner, Baron, and others practised upon rabbits, etc., all tend to the same conclusion. They chose animals as nearly as possible in the same good condition, and having subjected them to diminished food under confinement, cold and damp, they killed them, either while suffering such privations, at different intervals, or at other intervals, after being put under better treatment. The results gave them a view of tubercle in its origin, advancement and recession, very much corresponding to the respective conditions during life, and as certainly proving the possibility of its cure, as of its artificial induction. Mons. Coster's experiments upon dogs and apes, which he confined, under low diet, in cold damp cellars, but fed one portion of them on ferruginated, and the other on non-ferruginated bread,—showing that the latter all died tuberculated, while the former did not—point, in a certain degree, to the same conclusion. During the course of the late epidemic of typhus in Edinburgh, there have also occurred cases in which the patients have survived the febrile courses, and gone out of hospital, yet, returning afterwards, and dying of other diseases: their spleens have been found not yet recovered from enlargement, and containing tuberculous spots in process of absorption. One of these I lately witnessed myself, which seemed to afford a very good illustration of the point; but, indeed, we do not require to heap up cases in proof of so well known a truth, that the tendency to tuberculous deposits is not unfrequently of a temporary nature, due to temporary depressions of the system, and only leaving evidence of its former existence in certain puckerings of tissue, and calcareous precipitations.

Moisture and water.

Moisture is another of the necessities of the body, since indeed, it is almost entirely composed of water. Perfectly dry food would be utterly incapable of being digested, or indeed of undergoing any chemical change. It is known that the sufferings arising from extreme thirst are much more formidable than those from hunger. It has been customary to deny to water the name of a nutrient. It is true that no animal could live on water alone, but neither could it live without water. It is an essential ingredient of our bodies and our food, and ought not to be denied its proper rank. It may not undergo any alteration in passing the digestive tubes; but this should only prove that it is a direct nutrient, calculated to assume its place in the frame in virtue of its own simple qualities. While pure water is thus so absolutely required, it may often prove injurious from being tainted with foreign matter. The fearful effects of drinking the salt brine of the ocean are known to everybody. Consequences of a different kind have been attributed to snow and ice water, and the springs or rivers that arise from certain geological beds, are asserted to be the origin of sundry national or local diseases, as, glandular enlargements, and intestinal worms. These changes, however, it must be admitted, apply not to the water, but to its impregnations. The same observation may extend to watery vapour. The paludal exhalation is not considered hurtful as mere moisture; but, as being a solvent of the results of vegetable decomposition. Simple moisture

Water, properly speaking, a nutrient.

Evil effect of its impregnation with foreign matters.

Importance of purity of water.

however may prove injurious by leading to the saturation of the atmosphere, and thereby impeding that evaporation from the body which is so conducive to health.

Light. Effects of its exclusion.

Light seems, at first thought, a very intangible and uninportant agent as regards the nutrition of the body. Experience, however, has proved that paleness of complexion is invariably the consequence of exclusion from light, and that this paleness is not a mere "hue of fancy," but is always accompanied with changes in the condition of the blood, verging upon, and generally degenerating into, actual disease of the cachectic character. We may be the less surprised at this, when we reflect that many plants, innocent when grown in the light, are changed by shade into deadly poisons. Its power also of inducing violent chemical action among certain inorganic bodies, is a further proof of its energy, independently of its usual accompaniment, heat. More remarks, of a practical nature, will hereafter be made on this subject.

Organic elements in food.

Supply of the organic elements seems the most important condition of life, because it is the most obvious. The elemental constituents of the body are very numerous, and though the four substances that form protein be the greater in quantity, we must never forget that all the others, however minute, are equally essential. We hear a great deal of those experiments which tend to exalt the importance of nitrogen; but it is very obvious that a deprivation of any other one element, be it carbon, or oxygen, or sulphur, or phosphorus, would lead to results equally, or in some instances, even more fatal. Their several importance being admitted,

Their several importance

it follows, that a deficient supply of one or other, or all of them, may respectively lead to multiform disease, or death. Nature, in endowing man with an appetite for animal flesh, has provided a source of nourishment, which at once meets all the necessities of his body, without further trouble or consideration; whereas, to attain the same end by vegetables alone, would have required a judicious or most happy and instinctive selection of various different plants. In the civilized state, the cultivation of the grains, etc., affords a very perfect substitute for animal fibre; but it is a well known fact that the first state of all communities has been that of the chase, and not of tillage. As animals appropriate the choice elements of plants, so plants appropriate the choice elements of soil. Both seek after water, and both seek after air. The latter, however, serves different purposes in the two economies. The animal absorbs its oxygen, to throw it off again in combination with that combustible carbon which it received directly or indirectly from the plant. The plant devours the nitrogen to a certain extent, and all that carbonic acid which issues from the pulmonic system of the animal. That equal balance of constituents which makes the atmosphere one and the same through all regions, is a beautiful result of this mutual reaction of the two living kingdoms, and also a ruling cause in maintaining the health of both. Were soils equally alike and equally perfect, we would infer that the results would have been highly beneficial, but such has not seemed good. Soils appear to have been the result of agencies less universal in their operation than those that distributed the materials of the ocean or

Vegetables require selection and combination.

Effects of soil as regards food.

the atmosphere. The respective qualities of fluid and solid in some degree explain this: but it would not be proper to exclude from this consideration the very remarkable fact of the almost universal and minute distribution of phosphorus without any apparent localization of the treasure; its original source indeed, being altogether unknown.

Soils in relation to food.

Soils, therefore, according to their composition, may be a source of health or of disease. They are valuable in proportion to the animal elements which they contain. Men have usually had the discretion to settle in those spots that were the richest in nutritious matter; but there are certain tracts that are calculated for one kind of produce and not for another. One may be chiefly fitted to yield starch, a second sugar, a third gluten. Commerce serves to abate this evil, which is therefore a source of good, uniting man to man not by fleeting sentiment, but by the bonds of an eternal necessity. Where commerce does not exist, and such limited soils prevail, there must occur a prevalence of disease, and a diminished population. From this, along with other causes, arises the miserable condition of the alpine population, and other unfortunate hordes. To this alone can we attribute certain peculiar affections, which characterize particular districts, and which do not seem to be due to climate or moral condition, but to certain geological spaces often very far apart. The same principle applies to the scorbutic condition of the blood resulting from long voyages at sea. Much dispute has occurred as regards the individual element or elements, the absence of which gives rise to this morbid manifestation; and potassa, in combination with this or that acid of a vege-

Evil effects of defective soils.

table origin, has been markedly referred to as a chief cause. But perhaps the absence of almost any set of elements would lead to similar consequences. The subject is certainly obscure in theory; but happily there are no doubts as to practise, so that lime juice, or potatoes, will at once arrest the action. There is nothing appears to me more remarkable on this head than the distribution of those two Entozoa the Tænia Solium, and Bothriocephalus. The first is stated to prevail in western Germany, England, Holland, Egypt and the Levant; the second in middle and southern France, Switzerland, Russia, Poland and eastern Prussia; that is, on the further side of the Vistula. The imperfect regulation of society, by reducing certain classes of a people to subsist on food defective both in quantity and quality, may entail evils quite similar to those above specified, even though the soil be perfect. Hence those spectacles of stunted, ill-featured and diseased beings which meet us in the midst of wealth and civilization. The victims seem in worse plight, so far as the body is concerned, than the wildest savages, and for two sufficient reasons, viz: that the natural barbarian, if he subsist at all, receives some fair supply of animal food; while his mind is kept in full excitement by the independence of his situation. The barbarian of civilization is both on deficient diet, and labours under despondency as a consequence of helpless subjection. This was never, perhaps, so markedly illustrated as in the celebrated report on the health and mortality of Paris. It was found by calculation that in the first division of the City, which was the aristocratic one, the mortality was 1 in 45, while in the twelth.

Similar evil effects from injudicious diets.

where the cannaille lived, it was 1 in 24—the mortality of the others being found in exact proportion not to the relative position as to the river, or to soil, or putrid effluvia, but to the comparative poverty of the inhabitants. This conclusion, based upon a return embracing not less than 800,000 persons, during a period of five years, is very significant. In society better regulated, the same consequences may still flow from an abuse of the blessings of life—from artificial contrivances to circumvent nature, and destroy the constitution by gluttony or over-excitement. The most perfect example that nature presents to us of adaptation of food to the body, is perhaps that of milk. In this fluid we have all the required elements in nice combination, and at a grateful temperature. Yet even here, from improper diet, or violent emotions on the part of the nurse, the genial nutriment may be much altered in quality, even to so great a degree, as to become poisonous. I am fully persuaded that the foundation of much disease is laid by the administration of mothers' milk in a perverted condition, and that much of the mortality of the first year is due to that cause alone.

Air.

In reviewing the nutritive supplies, however, we must not omit to mention atmospheric air, that being one of the elements of sound digestion. This necessary, without which we could not live many minutes, is the same in chemical composition all over the world; but there are certainly districts where, from its superior purity, it appears to conduce in a special manner to vigour and longevity. Illustrations of this are furnished by the inhabitants of mountainous countries in all quarters of the globe. Travellers of credit have specially remarked upon the comparatively great number of shepherds between 90 and 100 years of age, whom they have seen in Sweden and Norway, with vigorous limbs, and undimmed eyes, tending their flocks among the cliffs. This is most probably due to a less amount of animal or vegetable gases tainting the air in these lofty regions, than might, and does occur on the damp and muddy plains; besides the established fact, that a diminished pressure of the atmosphere always increases the cutaneous exhalation, and thereby must remove in great quantity one of the most notable causes of disease. We know that there are many foreign gases in certain quarters, and that these gases exercise a very injurious influence upon the human frame. It may be true that many of them may be inhaled without being absorbed. Some persons also, may have drawn too sweeping conclusions as to their amount, from judging by the smell alone; while it is known that the olfactory nerve is so delicate an instrument that it discovers the presence of a gas which the nicest chemical test is unable to detect. But we must never lay aside the probability that nature furnished this nice sense for the express purpose of avoiding some evil influence, however minute. It is very certain that an habitual exposure to such fumes, even though in small quantity, will produce serious ultimate results. This applies particularly to carbonic acid, and sulphuretted hydrogen. Drs. Gregory and Christison both give evidence respecting the peculiar and almost indescribable effects of the latter gas, after being respired in minute proportions for some time. Dr. Gregory states further, that in each successive year, he is more

To be considered a part of the digestive pabulum.

Evil effects of impurities in the air.

and more easily affected by it; showing that a permanent impression is left on the constitution by which its liability to injury is augmented. These few considerations are quite sufficient to excite a conviction of the great benefits that would accrue from a universally extended system of drainage and ventilation, coupled with the careful distribution of all decomposing matters. Exercise abroad has also a close connexion with this question, and will be spoken of hereafter. To stuff the stomach, and starve the lungs, is too common an imprudence even in civilized society.

Equanimity of mind necessary to health.

Broad definition of equanimity.

An equable state of mind is another of those conditions necessary to the healthy operations of the vital principle. This equanimity does not consist in apathy, or stupid indifference. On the contrary, it embraces an almost indefinite circle, and comprehends the full developement of all the passions and faculties of human nature. One qualification however, is always demanded, viz: that they be sufficiently subject to the centre-power of rational volition. Without this beneficial gravitation, mind and body run to wreck; but, possessing it, all is safe, however wild and eccentric the flights of the individual may be. The poet may indulge every feeling of the heart; steep his being, as he might express it, in the most dazzling fountains of glory; "exhaust worlds," and then "imagine more." The philosopher may withdraw from the living world, wrap himself in the mantle of solitary reflection, and experience little pleasure from individual objects, save as they minister to the generalizations of abstract truth. The great statesman and the great soldier may pursue their exciting careers; the lover may indulge his transports, the

Latitude of nature.

merry man his laughter, the mourner his grief; but all come within this definition of equanimity, provided they are endowed with self-control. Nature thus allows to the human mind a very great latitude of growth and action without interfering with its own health, or that of the body. Undue or untimely exertions, however are certainly injurious, more especially when they are urged by the stimulus of vehement passion. Their malign influence upon the liver, the mammæ, the stomach, the bowels, indeed, all the organic structures of the body, has been recognized from the days of Hippocrates. It is pleasing, however, to reflect that all these effects are chiefly referable to passion, and not to purely intellectual exercises, which are characterized by a moral calm. It has been said, "whom the gods love die young:" but this is rather a sentimental figure of speech than an expression of fact. Omitting the violent deaths of troubled times, history will be found to prove that a life of habitually profound reflection, and lofty purpose, has generally been a long one. It quite consists with a priori reasoning that, cœteris paribus, those individuals should secure the longest and happiest existence, whose tone of mind carries them above those excesses and dissipations which are such fruitful sources of disease. Mere worldly prudence, or a weak indifference, may lead to the same result, and from the same cause of avoiding excess. It is not sought to be proved that great mental powers are any index of longevity; but only that their fullest exertion is not inconsistent with it, and, cœteris paribus is even favourable.

Evil effects of stepping beyond the latitude allowed us.

The violation of the boundary chiefly due to passion.

Such are the influences which are naturally ever acting on the constitution, and always for its benefit, except they be too strong or too weak. But there are agencies of another order, whose tendencies are essentially injurious, and which can never benefit the frame, except by counteracting some opposite evil. These are, in greater or less degree, poisons, and may be divided again into two classes, the first embracing those conditional poisons whose operation depends on bodily predisposition; the second, the certain poisons, whose destructive or evil consequences are, so to speak by comparison, invariably the same. Amongst the former we might enumerate the miasms of ague, typhus, cholera, scarlatina, dysentery, measles, influenza, erysipelas, puerperal, etc., and amongst the latter, the matters of variola, syphilis, hydrophobia and itch, the various noxious gases, as carbonic acid, sulphuretted hydrogen, or chlorine, and all those mineral and vegetable productions, a list of which would occupy pages. There are also products acting after the manner of poisons which are developed within the body itself, neither introduced as such from without, nor capable of being conveyed to another constitution. Such are the urates of gout, the sugar of diabetes, the pus of hectic, the deposits which are called malignant, and all natural excretions when they are retained in the system. On some of the most important of these I shall now bestow a few general observations.

General consideration of poisons.

Their classification.

Paludal Poison. This is now admitted to be the result, not of simple damp, but of a certain decomposition of vegetable matter. The miasm is found to be developed most abundantly at those periods of the year when the water has partially

Paludal poison.

or almost entirely disappeared from the marshy wastes, leaving extensive masses of dead and dying vegetation to the combined influences of air and moisture. If, under these circumstances, water is conducted to the spot, so as to submerge the putrefying matters, disease is found to decrease. This fact has been illustrated in most districts where foul marshes abound: and Holland, on a very large scale, has more than once afforded evidence to the same effect. During invasion, the dykes have been broken down, in order to obstruct the march of the hostile armies; but, the danger being past, and a sudden retrocession of the waters being effected, universal disease of a most alarming character has immediately followed. No remedies devisable by physicians, and applied individually, have had the slightest effect in subduing the pestilence; nor till the universal plague has been met by a universal check, has any good been done: no sooner however, have the lands once more been inundated, than health has been restored. Their gradual drainage did, comparatively speaking, little harm, disease being only partial. From this peculiar poison, dry and mountainous districts are of course free, except by accidental accumulations of the necessary materials. Extreme cold is also a preventive of the specific chemical action, and therefore of its consequences. While moderate heat is required for its developement, intense heat greatly aggravates its horrors; whether from exalting the virulence of the poisonous products, or by depressing the vital powers of the recipient, I shall not presume to judge. From whatever cause it may happen, certainly the effects are greatly modified by climate. Hence the

Nature and effects of paludal poison.

Its localization.

Its modification by climate etc.

contrast that may be drawn between those milder manifestations that occur in our native fens, and along the flat banks of northern rivers, and the heavier visitations in the Pontine marshes; worse in the sunderbunds of Bengal; worse still in the rank valleys of the West Indies, South America, and China; worst of all in those wide spread, and putrid flats, which extend from river to river on the western shores of Africa, the surface baked by the rays of an intolerable sun, but the rolling mud bubbling beneath, and emitting its deadly gases through innumerable chinks and fissures. The opponents of this doctrine, for a long period, made their chief stand on the fact that these peculiar diseases were not only witnessed on the scenes of this natural chemical action, but also broke out in great virulence amongst the crews of ships at sea, far removed from any spot where such decomposition could occur. By and by, however, investigation demonstrated that these vessels carried along with them a fountain of continued sickness. Their bilge water tainted with variety of vegetable materials, has constituted a tank of pestilence. When the lower boards or timbers of such ships have been lifted, on their arrival in tropical ports, the spectacle that presented itself has been described as almost incredible to those who had seen these under-holds so very recently cleaned out. The task of emptying these pits has often been found too much for the enervated bodies of Europeans, so that they have died in the attempt. The more vigorous frame of the negro is better fitted to endure the labour; but even that has sometimes fallen a rapid victim to this concentration of poisons. Paludal pestilence, therefore,

Its origin and action.

however modified by other circumstances, owes its essentiality to the extensive chemical decomposition of vegetables, under moisture, and certain degrees of heat. Though requiring a predisposition, which generally consists in a diminished nervous power, whether resulting from long continued cold or heat, or other exhausting influence, it never seems to arise apart from the miasm, or to be communicated by contagion or infection. This may be advanced as a general truth, yet we must not shut our eyes to the numerous reports of experienced men, that the more severe forms of such fever have, on their victims being crowded together, seemed to assume an infectious character. This they state, to have occurred on high and dry elevations, and also on board ship, long after leaving the coasts where it first broke out, and irrespective of any foulness of the hold. This latter fact was never better illustrated than in the case of the Eclair, the crew of which vessel caught malarious fever in its worst form on the coast of Africa. To escape from its causes they put to sea; but the disease continued to be communicated from body to body. Touching at the Cape de Verd Islands, it spread over them; and victim after victim still sunk, though the ship steered through northern latitudes. It continued its ravages in its original form even in the British roadsteads, and a tribute must be paid to the memory of those heroic members of the profession who volunteered to stand in the breach, while quarantine was enforced, and who fell as sacrifices in the cause of science and humanity. This does not, however, by any means overturn the doctrine that the disease is not generally communicated from individual to individual. The well known experi-

Predisposition to its operation.

Sometimes contagious.

Notice of experiments on the point.

ments of the ardent French pathologists, and others—experiments equally disgusting and heroic—in which they slept in the impure beds, actually eat and drank the foul excreta, and embraced the putrifying bodies of the dead and dying patients, appear sufficiently decisive, but it had been well enough known before, that many persons could expose themselves with impunity, not only to contact with the sick, but to the original miasm of the disease. These special experiments, therefore, proved nothing beyond what could have been gained from a system of enlarged observation, which is this, that all these diseases owe their origin to paludal vapours, and may become personally infectious, when the sick are huddled together in masses. One more fact is to be borne in mind, viz: that after one attack of this kind, be it simple intermittent, or yellow, or jungle fever, the body, ever after, is more prone to be affected, even on a slighter application of the exciting cause. They therefore, permanently modify the condition of the system.

Typhus. Its origin.

TYPHUS, MIASM. As the last mentioned poison has a special connexion with vegetable, so the present is associated with animal decay. Its existence, however, is dependant on a certain range of temperature, so that it is unknown either under extreme heat, or extreme cold. What the precise nature of the poison is we find it impossible to say. Some have attempted to make it identical with animal matter in a state of simple putrefaction, and many cases are adduced where the inhalation of such odours by man, or the injection of rotting fluids into the circulation of animals, has led to a series of morbid manifestations very much resembling

Actions of typhus.

the march of typhus. An objection is taken to this, on the fact that those who are engaged in the filthiest employments, such as emptying cess-pools, and flaying horses, etc., are not more liable to it than other men. Doubtless these persons are generally well paid and well fed, and are also inured to the vapours, which are fit considerations; but yet there does seem to be something more necessary for the characteristic features of typhus, than mere animal decay. It appears pretty certain that an individual is much more likely to be affected by disease from being in the vicinity of others labouring under it, even though there be no offensive smell, than from exposure to the nauseating effluvia of the shambles or dissecting room. Much confusion is apt to beset the matter, from our habit of arranging under the terms typhous, or typhoid, every type of febrile action, which assumes a character of stupor or bodily prostration. Such a latitude of definition admits a host of disorders, similar, no doubt, to typhus in their termination, but neither originating in the specific poison, nor generating that poison, nor running its particular course as to time. The graver forms of erysipelas, of small-pox, and ordinary inflammations, afford examples of this distinction. We confine the name of typhus, then, to that miasm, mysterious in its nature, but unmistakeable in its effects, which appears to be generated from human bodies when crowded together in a state of filth and general discomfort. A certain degree of debility or depression seems to constitute the necessary predisposition, influenced, however, by the degree of concentration in which the poison exists, or the gradual manner in which

Name often too extensively applied.

Predisposition.

the body may have been inured to resist its operation. The debility or depression is not required to be persistent; for any temporary prostration of the strength will open a door for its assault. Hence the common spectacle of vigorous and muscular men being brought to the wards of the hospital, the history of whose cases is usually characterized by the three consecutive facts of—1st. a "very hard day's work,"—2nd. a tiresome walk home, and—3rd. a lodging for the night in some of the hovels of a fever-generating district. But unless under such, or similar circumstances, no fact is better established than that this miasm is as innocuous to the vigorous and cheerful, as to the weakly and desponding it is deadly and irresistible. The sphere of its mischief is also a confined one, and it appears to lose its efficacy on being diluted by the atmosphere. Good condition, as it is called, and free ventilation, may therefore be laid down as almost inconsistent with its existence; but that will be dwelt upon hereafter. I may only now add that there is a chemical theory which considers the miasm as a ferment, and the predisposition as a morbid fermentible something in the blood, without both of which typhus cannot possibly supervene. Certainly we are equally ignorant of the miasm as of the fermentible something, but there is yet a regularity of disintegration in this diseased process very similar to fermention in its extended philosophical sense, and it therefore does not become the sincere inquirer to treat a supposition with contempt, the investigation of which may lead to very important discoveries, irrespective of its own truth or falsity.

Predisposition to typhus.

The vigorous resist it. The weakly are victims.

Chemical theory of the typhoid action.

MIASM OF CHOLERA ASPHYXIA. The origin as

Cholera Asphyxia. Some resemblance to Typhus.

well as the progress of this poison is involved in great mystery. It seems, however, to bear a similarity to typhus, and to be generated and propagated under much the same circumstances; except that it is not so easily diluted, and thereby rendered harmless. From the resemblance, in some points, one is almost induced to view the poison of cholera as a variety of the typhous, modified and concentrated by peculiarity of climate, and retaining its acquired character even after a removal to opposite temperatures. The first effect of the poison, like that of typhus, is great nervous prostration, in some cases causing almost instantaneous death by paralysis of the pulmonic nerves; in others, inducing the symptoms of the cold stage, which, if overcome, are followed by a fever analogous to typhus, except that its infection does not produce our home scourge, but the true exotic importation. Like typhus, it also seems, as a general fact, to follow the crowd. Dr. Williams, in his celebrated work upon "morbid poisons," adduces a long series of statements, apparently with the view of controverting its contagious nature; but it has always appeared to my mind that these very statements have quite a contrary tendency. We have a picture of the plague originating in Jessore, a densely peopled and filthy city of India; radiating thence in different directions; but chiefly fixing on the great neighbouring cities, and, Calcutta itself amongst the rest. From Calcutta, we find it making huge leaps to the grand army at a distance, to Bombay and Madras. We follow the grand army on its march, endeavouring to avoid the pestilence; but the pestilence marches along with it, leaving its trail behind, and throwing

Its general course.

out its influence in every direction. We see it penetrating amongst the thick population of China, of further India, and westward to Russia. From Astrachan, it passes to Moscow, and from Moscow to St. Petersburg. It reaches the sea-ports of Germany, as Hamburg, etc. Thence it is supposed to be carried to Sunderland and Newcastle; and next, passing over the immediate country round about, it visits Edinburgh, London, and Paris in rapid succession. Now, as in India, there was likely more communication between Calcutta and the grand army, and Bombay and Madras, than between any other four points: so, in this part of the world, there was likely more communication between the point of origin—New-castle—and Edinburgh and London, (thence to Paris,) than between Newcastle and other points. Each city suffered in its turn, and when remote districts were attacked, it was generally traced to some communication from the centres of disease. Even when not traced, we are not entitled to deny it, when all the analogies of the case plead the other way. Doubtless, the evolutions of the pestilence appeared very eccentric; and its leaps hither and thither staggered the mind of the observer. But its very eccentricity rather contradicted an atmospheric origin, and proved a contagious one. Great questions, indeed, are to be settled by great positive premises, and not by viewing isolated negative facts. It is an established general truth, that the plague was propagated from great city to great city, not through the common medium of the air; but always along the chief lines of traffic, whether they were rivers or dry roads; and these cities have always suffered in proportion to their closeness,

Its infectiousness considered.

their filth, and their poverty. It has been asserted that these places suffered most, merely because there were more people to suffer, but that is contradicted by the fact, that certain portions of the sparsely peopled country were attacked severely, while some large towns, most especially Birmingham, entirely escaped. We have also numerous relations of the manner in which the disease was introduced into these remote places by the visits of persons from infected parts. But this is an insignificant argument compared with the above general statement, which has not been questioned. Certain further circumstances accompanying both the seizures and the exemptions are also of great weight. Thus, we find armies attacked immediately after the junction of infected corps; these corps communicating the disease to each village through which they passed; one person after another dying of it immediately after contact with the sick, in a manner too striking to give rise to any other than one idea. We trace it to the arrival of vessels in ports, and even to infected clothing. In the worst parts of infected cities, and among the most wretched classes, the seizures have only amounted to 15 per cent, while those among picked and fearless nurses of hospitals, etc., exposed to a concentration of the influence, have been 35 per cent. In a city of 200,000 inhabitants, two persons are found to have visited an infected vessel from abroad. These two have died, while none others in the city were attacked, showing a probability of 100,000 to 1, that the disease arose from infection, and not from the atmosphere. Equally remarkable are the facts of the escape of certain isolated little communities, even in the midst of the pestilence. Amongst these, high walled prisons have been the means of protecting their inmates from its assaults: yet, when these prisoners have been compelled, by reason of the flight of the townpeople, to undertake the unwelcome task of burying the forsaken dead, they also have rapidly become victims, and suffered with a malignity proportioned to their unhappy condition. Whatever the specific nature of the virus may be, does not affect this great question of its infectiousness. Be it an animalcule, as Linnœus would have had it, or an exhalation, or a mere imponderable influence, still it appears to be localized, and strictly so in the bodies of the affected, passing thence to other bodies that are fitted to be its recipients. Debility or depression, as in the case of typhus, constitutes here the predisposition, and so far we are enabled to ward off the assault: but the nature or origin of the miasm is altogether unknown, and therefore, no suppressive measures can be proposed with the same hope of success as cleanliness and ventilation afford against typhus. Perhaps its manifestation is chiefly connected with diet. It proved, at least, most fatal among the poorer nations, using acescent vegetable food. The insignificant ravages of this disease in England, as compared with its frightful mortality in France and other countries in 1832, give good ground for this opinion. As to treatment, I think I have seen almost every potent article of the Materia Medica employed against it, but without any success that was distinctly traceable to them as specifics. In our present state of knowledge, we can only meet symptom by symptom. To check the preliminary diarrhœa is one great matter, not that we are entitled to say that every diarrhœa so checked would have run on to cholera asphyxia; but if in almost all cases, such diarrhœa be the precursor, it is of prime importance that we grapple with that first symptom.

Scarlatina. Its origin.

POISON OF SCARLATINA. The origin of this poison is a matter of very great uncertainty. Whether it may have been first generated in the body, and afterwards diffused through the atmosphere, or vice versa, it is at present impossible to decide. As it is true, however, that it often operates after the manner of an universal epidemic, so is it equally true that it passes from individual body to body as a simple contagion. Of its nature we know nothing whatever, except as a peculiar evil influence which assaults the constitution, and produces a series of consequences always sufficiently well marked to enable each case to be at once referred to its species. The throat and the skin appear to be the chief seats of this demonstration, and every other organ suffers in a lighter or graver degree, according to the virulence of the miasm, or the comparative strength of the victims; hence the division of the disease into simple and malignant. Cholera has been called erratic; but the term is much more applicable to the virus of scarlatina: and this is a mode of action which, to my mind, much more supports the probability of its corporeal, than atmospheric origin. No doubt there are states of the atmosphere which favour the diffusion of this, as of other essences; but if this scourge were due to the state of the atmosphere alone, it would certainly in its visitations be more equally divided. On the other hand, we find it leaping, as it were, over miles of population, to attack a single family, there perhaps cutting off

Nature of scarlatina.

Its mode of attack.

the whole young flock, and with a rapidity that startles even the physician, while it horrifies the parent. Thence it makes another leap to strike a similar blow in some other quarter, and should it alight in some large seminary, the ravages are in proportion to the numbers. There are, in many of these cases, a clear proof of intercommunication having taken place, and I feel persuaded that almost all of them would afford the same proof if duly investigated. Young persons appear to be the special victims of this poison, but though it may have stronger effect upon the weakly, it does not seem that the most vigorous health, or purest air, affords any certain protection against it. The children of the highest, as of the lowest, are alike seized and destroyed.

Its contagiousness.

There is a familiar but yet very curious and inexplicable feature which this miasm exhibits in common with some others, viz:—its occurring but once in any given life time. If there be one character in the history of disease more than another, that favours the theory of a ferment and a fermentible something, it is this fact of the exhaustion of liability. It would almost seem, in such instances, that there had been a congenital fermentible something in the blood, only awaiting the efficient application of the ferment; the mutual reaction producing excretible results in which were carried off every element of the original morbid tendency. In those very few examples where this and other such miasms have taken effect more than once, we may conclude that the first fermentation had not been sufficiently perfect, or else that the constitution had subsequently proceeded to elaborate a fresh store.

Exhaustibility of Scarlatinous Diathesis.

This may be a theoretical mode of expression; but yet it indicates the plain fact. If it be alleged that we know nothing of this fermentible something, it must be equally admitted, that the miasm also is utterly intangible. Yet no one doubts the existence of the latter. It is an existence recognized by reason, though hidden from the sight; and so are we warranted in acknowledging the presence of the former by its effects. It is obvious that when such miasms were first applied, there was a condition present in the body favouring their pernicious developement. After that first developement, no fresh application could re-induce it. The condition therefore, was an efficient something which has subsequently been removed. Call it by what name we please, it is a specific entity, though we know not its precise nature. In this view, it resembles not, in the least degree, the operation of any ordinary poison; but it does certainly resemble the process of fermentation which cannot be re-excited after all the stages are once gone through. The question, as it stands at present, may have little bearing upon practise; but its investigation may lead to important results, such as could never be attained while we contented ourselves by calling it a mystery. The ravages of small-pox have happily been arrested by a vicarious virus of milder character, and so, perhaps, may this malady, certainly not so disgusting or so prevalent as small-pox, but of more terrific rapidity. From the crowding of symptom upon symptom, their grave tendency, the general youth of the patient, his inability to describe his feelings, and often frantic aversion to treatment, there are few acute diseases in which the physician feels so

The diathesis an appreciable entity.

Referred to fermentation theory.

painfully the inadequacy of his skill. Prevention, therefore, is of prime importance.

Measles and Small-pox.

MIASMS OF MEASLES AND OF SMALL POX. The symptoms of the diseases which arise respectively from these miasms, are sufficiently distinct from one another, and from the preceding exanthematous fever. But yet they strongly enough resemble each other in their mode of origin, and their future character to be grouped together in one argument. Each of them is induced by a specific poison acting after the manner of a ferment. In each of them, that poison requires a pre-existing condition, or fermentible something. In each of them, there is a particular course as to time, etc. In each of them, apparently the miasmic ferment is increased and thrown off, and the fermentible something resolved into its final stage of decomposition, never again to be renewed. The mode of their dissemination, also appears to me, to resemble that of scarlatina, the state of the atmosphere only favouring their diffusion, and not of itself generating them. Variola, however, is more certain in its effects, than either.

Their origin and nature.

Dysenteric virus. Its obscurity.

VIRUS OF DYSENTERY, This is a matter of obscure origin and character. Indeed I should scarcely feel myself justified in ranking it amongst the specific poisons; but for its peculiar action on a limited part of the body, and the positive statements of able observers as to their witnessing again and again the propagation of this action in such a manner as left no doubt upon their minds of its contagious nature. We witness its manifestations under certain circumstances, of heat, damp, fatigue, and insufficient or improper nourishment. This would lead us to place it under the category of ordinary inflammation. But its limitation to the lower intestines, makes us look for a peculiar and specific cause, which is further enforced upon us by the descriptions of its sometimes extending among masses of people when once introduced, altogether independently of the above general circumstances of heat, damp, and privation. This, of course, is understood to apply only to that severe form of dysentery, ranked as "pyrexia contagiosa" by Cullen, whose decided opinion upon this point is well known and indicated by the very term which he employs. For and against that opinion, we find a full array of eminent names, pretty equally balanced.

Contagion of Dysentery.

It would appear, however, on a review of the evidence (that which is against it being only negative,) that dysentery, like remittent fever, though not potently contagious, may yet become so when the cases are crowded together, and the peculiar intestinal discharges can emit their vapours or gases in sufficient abundance. These vapours or gases, which give peculiar odours to the fœces of the dysenteric, appear to have an intimate connection with the morbid process, and not to be the mere result of common putridity.

Curious chemical coincidences, external to the body, in reference to Dysentery.

Dr. William Gregory has stated to me, that in the course of his experiments on kreatine and other animal principles, he has, on certain occasions, perceived feculent smells exactly resembling those that occur in dysentery; and that they were always coincident with the deposit of a mucoid precipitate in the digesting vessels, equally resembling the discharges that go along with them in the disease. These occurrences took place accidentally; nor was he able to detect the particular circumstances or chemical changes under which the mucoid matter was formed or the odours evolved; but when these are discovered, I conceive that they will not only clear up our views of the pathology of dysentery, but also, perhaps, improve our treatment of it.

Influenza. Its origin and nature.

INFLUENZA. This seems to depend entirely upon some atmospheric condition, with the nature of which we are not yet acquainted. Its first effect upon the system, is that of great depression of nervous and muscular power, and the chief predisposition for its assault is a previous state of depression, though that is by no means essential. When it takes a powerful hold of the patient, there is such a sudden sinking of strength and spirits, such an overcoming head-ache, and sometimes vomiting; such a rise of pulse, darkness of tongue and burning heat, as to excite fears of its proving the advent of continued fever. If the constitution be sound and vigorous, these severe symptoms prove very evanescent, though they leave some weakness behind. On the other hand, should the patient be aged or infirm, or previously affected by other complaints, especially those of the chest, then the results are exceedingly serious, and too often fatal. Hence the report respecting the last visitation of this disease that it had carried off more victims than cholera itself, that is to say, collectively and immediately; for the proportion of deaths was small compared with the almost universal attacks, and there were few indeed of those fatal cases that had not supervened upon serious pre-existing disease, or the infirmities of old age. To hospitals, therefore, it proved a great scourge, frequently cutting off in a few days or hours,

Its fatality not due to its own severity.

Referred chiefly to its supervention on previous disease.

those who might have survived several months, or even recovered from their chronic ailments, but for so acute an onset.

Erysipelas and Puerperal. Their origin and nature. Their general resemblance.

Miasms of Erysipelas and Puerperal Fever. If these miasms be not identical, they at least very much resemble each other in their history, their effects, and mode of propagation. Both seem to be generated as emanations from the crowded bodies of persons labouring under disease, more particularly if the disease be of a nature that induces putrefaction. Thus, both the one complaint and the other are rare in the country, or where people are not exposed to a concentration of sickness; while they display themselves more commonly in towns, particularly in hospitals, and more particularly in those wards or departments, where gangrenous sores, or foul discharges are most found; that is to say, the surgical, and obstetric parts. The medical wards also suffer, especially if they be crowded and ill ventilated; and I am disposed to think, that the evil is greatest when there happen to be numbers of patients labouring under such sloughing ulcers as are consequent upon typhus. There can be no doubt that when these diseases are once generated, they elaborate a specific poison, which is directly contagious; but I think it is equally certain that they both may arise without any direct contagion, and in the manner above alluded to. Their connection with simple putridity is sometimes seen in a more direct form. Some cases mentioned by Dr. Alison, bear strongly upon this point, of which two may suffice as instances. The one is that of a Surgeon who had scratched a slight pimple on his hand, after handling a portion of

Connection with simple putridity.

putrid protruding brain. Erysipelas supervened. The same occurred to a lady, and with a fatal termination, who had, with a scratched finger, dressed the arm of her son, a medical student, suffering from a dissection puncture. A similar cause has been found to induce puerperal fever. Most cases are characterized by some previous abrasion of the surface, and this applies to puerperal as well as erysipelas. Both are apt to assume a very low type, and, indeed, the local inflammations, and other visible changes occurring in each, are altogether subordinate to, and dependent upon, that constitutional disturbance, which is the result of the absorption of a morbid poison. I must not be understood, however, as asserting that this morbid poison is always necessarily a foreign production; for, on the other hand, I am inclined to believe that isolated cases of puerperal fever and erysipelas may and do occur without any contact, either directly or indirectly, with those who have the diseases, or any possibility of absorbing foreign putrid matters, but altogether from some elimination, and re-sorption of certain irritative compounds within the patients' own bodies. Whether these matters be simply putrefactive, or possess specific qualities, is for future inquiries to determine; but in stating that the above is the fact, we advance nothing new, but only acquiesce in the general doctrine of idiopathic disease. To handle such individual occurrences, (except for investigation) would be trifling with a great question. Nothing is better established as a general fact, than that pure air, or absence of foul emanations, affords an almost entire protection against the onset of this fatal order of disease. The prac-

Putridity may arise from patient's own body. Means of protection.

tical course of protection is therefore very clear, yet it is not entirely satisfactory to the rational mind, nor can that mind be contented until it has traced back one more link of the chain. If the cause be a physical one, it is not beyond our powers of investigation, and that it is physical, I think there can be no doubt.

Small-pox.

MATTER OF SMALL-POX. This, when directly absorbed, appears almost invariably to take effect, except where the constitution has been rendered invulnerable by a previous attack of the same sort, or of cow-pox. It acts after the manner of a ferment, and the occompanying fever may be mild or grave according to concomitant circumstances. Its courses are fixed; and it is a very remarkable fact, that while the poison is a specific one, and that poison in all its virulence is developed in every pustule that appears, yet the suppression of the pustules, so far from increasing the internal ferment, rather diminishes it. In this point of view, it differs greatly from all other diseases that manifest themselves on the skin, which makes us feel the less surprized at the old heating treatment, as compared with the modern improvement of cooling the body, and repressing its purulent crops. No less singular is the fact of exemption from it, after vaccination. Disputants have appeared desiring to tear the laurels from Jenner's brow, on the ground of some cases of failure. I have already remarked, however, that to enter into individual details, is only to trifle with a great question. Men of the best observation are aware, that those cases of small-pox which occur after vaccination, are almost all of them scarcely worthy of the name, when compared with that

Nature of Small-pox.

Asserted evils of vaccination

Assertion combated.

loathsome and terrific malady, the natural small-pox. The observation of faces in the street, as contrasted with their appearance, some years ago, enables even the non-medical reasoner to arrive at a conclusion. But the disputants advance another argument, asserting that while we may have diminished variola in its severest forms, we have, in so doing, taken away a sovereign purger of the blood, and thereby increased the liability of the human frame to more fatal disorders. This is an assumption purely gratuitous, the proof of which rests with them. Even granting that general and fatal disease has been more prevalent for the last twenty years, we are bound to remember the consequences of a state of peace,—not as simple peace, certainly,—but as a subsidence of society into a certain degree of stagnation, with loss of employment, and consequently of comforts to the poorer masses of population, as compared with that bustle of national excitement, when governments were raising by loans an enormous capital from the rich, to be all expended on the maintenance of an immense armed force, whose corresponding consumption of food, and all other material, called forth the profitable exertions of almost every branch of industry at home. After this activity and expenditure of capital, came payment of interest and diminished employment. Such grand facts can never be overlooked in statistical considerations. Crowded populations, over labour, filth, and extreme poverty, afford sufficient explanation of the increase of certain fatal diseases, within the last twenty years, without looking for a cause in the bugbear of vaccination: and before these disputants, (few but not uningenious) can induce us to assent to their dogma,

Acknowledged evils referred to other causes.

they must prove that these fatal fevers, etc., have a closer and more direct connection with the banishment of small-pox, than with the causes above named. Not the least curious feature in the history of this ferment, is the fact of its penetrating to the fœtus in utero, even while the body of the mother is unaffected. It certainly appears strange, that it should circulate with the blood in the maternal system without any manifestation, and immediately exercise its virtue as soon as it enters within the fœtal circle. This appears to me to support, in a considerable degree, the fermentation theory. Those of another opinion assert that, in cases of exemption, the virus cannot enter, as such, into the body; or, if it do, is immediately decomposed. But here we find it entering and running unaltered the whole round of the circulation; yet not acting, until it reaches that sphere where, from the vital centre of a fresh organism, a fresh predisposition, or fermentible something is eliminated, with which it coalesces, and goes through the usual stages.

Small-pox in fœtus, illustrative of the fermentation theory.

MATTER OF SYPHYLIS. This is a specific poison that always acts through inoculation, and has no analogy to ferment. On the other hand, when once imbibed, its action has no end, except in the destruction of almost every tissue of the body, and it has no accompanying fever, except such as may arise from ordinary inflammations, or other irritative causes. Spontaneous cures have been recorded, but they are rare exceptions to the rule. The general fact is that, after imbibition of the poison, there is a perpetual generation and resorption of it till the whole body is involved. Whatever may have been its original source, we have no account of its ever

Syphilis. Its origin and action.

having been generated, except through previous communication with bodies already tainted. Sores, and other symptoms, are said to arise from filthy and promiscuous intercourse, very much resembling the syphylitic type; but there is no proof of an undoubted virus claiming any such beginning. This explanation, indeed, would very ill accord with the opinion of its importation from America, and it would just as little agree with its non-existence as an idiopathic disease in certain eastern and southern climes, where, for a series of centuries, the most disgusting and abominable impurities are known to have prevailed. It is one of those subjects of which we must confess a decided ignorance. After its first appearance in Europe, it spread with surprising rapidity, and still maintains a steady empire, in spite of all improved means of suppression. No doubt, it has greatly abated in all well regulated communities; but, when its mode of propagation is so well known, and its action is seen to be so dreadful, it is rather surprising that more decided and extensive measures have not been everywhere adopted for its extinction. It would appear that a certain length of time is required for its absorption, and that the rapidity of that absorption depends on the integrity, or degree of thickness, of skin, in the recipient. Some are undoubtedly more liable than others to the infection. A few may be invulnerable, while those of a lymphatic temperament, or scrofulous habit, seem peculiarly sensitive of its action. But removal of the matter, in almost all persons, within a short time, certainly much lessens the chance of injury; though such a deliberate caution is rarely practised by those who abandon themselves to be the slaves of headlong passion. It is a very great source of comfort—an incalculable good, which we can only appreciate by supposing a contrary fact and all its lamentable consequences, that no proper passion, however fully, or even excessively indulged, can evoke the virus, and that nothing but vice, and vice of the most incautious nature, breeds this hideous and appalling evil. But this must not induce us to view it as a special providential scourge of human depravity. Whenever providence intends a necessary evil, we are always left without a remedy. Such is not the case here. Without entering into some modern modes of general treatment, and which, from the most respectable reports, must be admitted to have proved successful, we must at once recognize Mercury, as a direct specific, which appears to neutralize the poison, not simply by raising up, as they express it, an incompatible action in the body, but by actually destroying those peculiar proportions of combination, which make the virus what it is. Hunter's experiments of inoculation with pure matter, and with matter, mixed with Mercury, afford decided results; indeed, no one can avoid the recognition of a marked specific action in Mercury, whenever it is employed. Its misapplication nowise affects the question.

Hydrophobia. Its nature and origin.

VIRUS OF HYDROPHOBIA. This has no other origin than some modifications of the fluids of the dog or cat kinds, the subtle diffusive influence being elaborated, apparently, in the salivary glands. Of its physical or chemical nature, we know nothing. The conditions of its generation appear to be very uncertain; though several authors have laid down heat, rage, putrid food, starvation, fatigue and confinement, as efficient inducing causes. Some have asserted, Distemper said to be a prophylactic.

that it never arises spontaneously in any dog that has had an attack of what is called the Distemper. If such be the case, it is an all-important fact, and, from that consideration, deserves thorough inquiry, as confinement of dogs until they had the distemper, would then prove an effectual check. From every investigation, all appear equally open to the fearful action of the poison, if it be duly introduced into the system. The uncertain, and sometimes very protracted period of its incubation, gives great scope to reflection, and still involves us in doubt. Whether its action is general, and it lies latent in the system till it finds a condition favourable to its developement; or whether it has a local seat of evolution, and circulates unchanged in the general current, until it reaches that particular spot; or whether it has any other unimagined mode of operation, it is impossible, with our present evidence, to decide. It appears strange that any organic compound should remain unchanged for so long a period (as is stated in some cases,) especially while in contact with other organic matters in a state of perpetual disintegration. The fact, however, cannot be doubted, that a long period often elapses between the reception of the poison, and the outbreak of the disease. Some have stated that its peculiar determination is to the salivary glands; others follow it to the gums, fauces, or bronchi; while a third refer all the symptoms to its fixing on the medulla oblongata. The whole matter is involved in great mystery, and the cases are so rare, that few men have an opportunity of inquiring into the subject in a practical manner for themselves. Its defiance of all known treatment, when truly developed, is its most striking feature.

Hydrophobia. Theories of its action.

From the constant fatality that attends it, no one need shrink from the use of experimental remedies. Even if they should induce death, perhaps it would be in a less horrible shape than that which completes the frightful tragedy of hydrophobic inoculation.

Itch, Tinea Favosa, etc. Their general nature.

CONTAMINTIONS OF ITCH, TINEA, FAVOSA, etc. These are matters conveyed from one body to another, and inducing, not a general, but a specific action. Some are invariable in their effects, others are governed by circumstances. Some appear to be simply acrid fluids, others contain the ovula of animal or vegetable beings. Few, or I should rather say none, can resist the inoculation of itch or ring-worm, when properly and fully exposed to it. But, in the case of animalcules or vegetations, they would seem to be seldom ingrafted, except upon frames already reduced in vigour, and perverted in their elaborative functions; under which circumstances, their imperfect, and readily decomposable epithelia, would appear to afford the fit nidus for bringing the ovules into full existence. Thus the vegetations of Tinea Favosa are scarcely ever seen, save in what is called the scrofulous constitution, or those in whom a similar state of body has been induced by poor living and exposure; and the same may be said of those foreign growths that attach themselves to the digestive canal in cases of the aphthous affection. The system may not, in all such instances, have been of a scrofulous habit originally, but, if not, it will generally be found to have so suffered from protracted weakening ailments, or deficient nourishment, as to have led to a deterioration of its plasmata, bordering on the defective organic vitality of the real diathesis. Under this

Animalcular Theory considered.

head, we may also take notice of those other animals, larger as well as smaller, that assume an independent existence within the body, without actually breaking up the integrity of its fabric, as the creatures in the sudoriparous glands, in the muscular fibre, in the eye, in the stomach and intestines, etc., etc. These, beyond all doubt, are independent lives, and spring from ovules. The origin of the ovules has been a matter of much dispute. Some have asserted the possibility of a spontaneous generation, and suggested that certain cells might, under certain circumstances, take on certain functions, and lead to the production of certain animals. Such a supposition ill accords with the ordinary system of nature; and, indeed, it is all supposition together. No such cells have ever been observed assuming functions of this kind, except those of the semen of the male, or the Graaffian vesicle of the female; and even in that case, not without the coalescence of both principles; and under the universal rule of natural fact, as of reason, that no one result can accrue, without the previous operation of two distinct co-efficient causes or conditions. The ovules of intestinal worms have been found, but they have always been traceable to the animal itself, and to no other source. How they find their way from the intestines of one individual to those of another, it is somewhat difficult to discover; but that they are always propagated in this manner, and never arise from spontaneous generation, I do not suppose any sound naturalist or physician now doubts. There is nothing insurmountable in the argument; when we consider the many other examples of seeds and eggs being preserved from destruction, under the most unfavourable circumstances of cold, heat, and drought,

Origin of parasites.

Intestinal Worms, etc.

Their connection with food and soil.

until they meet with the fit conditions of germination. The condition necessary to the life of the Entozoal germ, as already observed, is one not consistent with perfect health, on the part of the recipient. When the parasites thrive within him, there must have been either a previously defective digestive power, or else an impropriety of diet. Hence their frequent abode in the bodies of neglected children, or of the poor, or of persons inhabiting districts where custom or nature deprives them of a varied fare. Food properly cooked, and of different kinds, a mixture of condiments, and a fair allowance of fermented or alcoholic drinks, appear to afford a thorough protection against them. In almost all barren and isolated parts, shut out from commerce, and drooping under a sameness, and a scanty sameness of provisions, you will find enlarged glands, and, along with them, (though not always in the same iudividual) intestinal worms of some kind or other. This I believe to be due to defects in the soil, and not to any peculiarity in the water or the air; for those who drink the one and breathe the other will yet escape, if they are in circumstances to command the extracts of other soils by drawing from the butcher and the grocer, etc., etc., the full complement of the raw materials of vital Chemistry. No doubt clothing and lodging have much to do with sound digestion, but yet they are only accessories, propriety of food being the one thing essential. Ill-dieted prisons, with no peculiarity of water, have exhibited similar results.

Chemical Agents, etc.

CHEMICAL AND OTHER AGENTS. These are as innumerable as the natural and artificial bodies that surround us. To reduce them even to classes, and bestow a sentence on each, would occupy a volume.

Such is not the object of this essay. I only indicate their mode of action, and general effects. It is the principles of disease that are sought to be elucidated, and individual agents are only alluded to by way of illustration. It has already been observed that the very constituents of the body itself, when in excess, have an injurious effect: much more those substances that form no portion of the fabric, and which, when introduced, can only act in the way of destruction. Such matters may insinuate themselves through various channels. I say insinuate, for I omit from consideration their direct and full application as unmistakeable rapid poisons. Some, in the form of gases or vapours, are admitted through the lungs; others penetrate the skin, or are absorbed by open wounds; while others, again, enter the digestive canal along with food or drinks. In all of these cases, they act in one of two ways; that is, they either are subtle enough to permeate the interposing membranes, and assume a hostile attitude among the circulating particles, or else they adhere to the absorbent passages, totally or partially obstructing them in their functions. Of the first kind of action we find examples in sundry gases and most medicinal agents; of the second, in mechanical applications, as of insoluble, or tenacious, or corrosive matters to the stomach and bowels, or irrespirable gases, or fine dust to the lungs.

The nature of their action.

Gases.

The importance of purity of air, has been already discussed. Whenever this purity is interfered with, the constitution is sure to suffer in a greater or less degree. The presence of one or two per cent of carbonic acid gas has been found inconsistent with health; and certainly there are other gases of a much more deleterious nature. In the open country we have little to apprehend from this source, except in a hot wet autumn, when decaying vegetable matter may emit malarious exhalations; but, in close towns it gives rise to serious evils. Within these "graves of human kind," as some one has called them, we have perpetual emanations of carbonic acid gas from the lungs, from fires, from manufactories, and from casual decompositions. We have Sulphuretted Hydrogen from decaying filth, and the vapours of various metals, acids, etc. But for the law of the repulsion of gaseous matters, and that some neutralize each other, as Chlorine does Sulphuretted Hydrogen, the very existence of towns would be nearly impossible. Where they are built on a sufficiently open plan, this law of repulsion affords a tolerably complete exemption from all bad effects; but it is a well-known fact that too many cities are so contrived as to resist, by the mechanical obstacles of lofty walls, this wholesome tendency in all gases; and so retaining the enemy even against his will. All who have perambulated the "terra incognita" of London, Edinburgh, and other such places, must frequently have felt their spirits depressed, as they threaded their way through narrow alleys, choked with population and all manner of filth; the high gables rising on either side, and excluding the sun and air, as from a deep ditch. Through these channels, planned with such pains-taking economy, flows the stream of pestilence. Miasms are concentrated, because there are no means of their being diffused through the general atmosphere. Even in towns built upon special principles of ventilation, there must be spots where persons are more crowded to-

Vapours, dust, etc.

Their effect upon large towns

And on various trades.

gether, and foul emanations are more abundant; at the best, there are callings that must be followed within doors, and under an atmosphere very different from that even of the streets. Omitting the employments where persons are simply crowded together, we have brew-houses, bake-houses, and many chemical works and common trades leading to the constant inhalation of injurious particles, such as the above gases, with the vapours of Lead, Mercury, and Arsenic, or the fine dust of stone, cotton, flax, etc. These, of course, all act as foreign bodies, and induce irritation according to the degree in which they may be applied.

Localization and limitation of specific

The gases, as being more volatile, may be more evanescent in their effects; the metals retain a more obstinate hold, and fine dust, irritating the tender points of a constitution enfeebled by confinement, and, also, perhaps, errors of diet, lead to the deposit of tubercle, or other caco-plastic exudation. From these various causes come the sundry complaints characteristic of towns, and of particular callings. They are general and invariable in their operation, and require no special predisposition for their reception. All are alike liable, if equally exposed to their influence, though the weak may be a little more easily affected than the strong; and the prudent and cleanly escape with slighter injury than the thoughtless and filthy. All this is well exhibited in the general scrofulous diathesis of the town, the special Cholic of the painter, the Palsy of the type-founder, the Phthisis of the stone-hewer, the Scrotal Ulcer of the chimney sweeper, or the fearful train of symptoms that attack the workers in mercurial or arsenical operations. The same observations are applicable to medicinal and other agents. Such injurious matters may be habitually taken with the food, or medicines may be administered in such extravagant doses, as permanently to affect the system, or they may be constantly used in such a way that the constitution becomes modified in a manner that borders on disease. The habitual swallowing of small quantities of paint or putty with the aliments is a very familiar fact. Equally familiar are the consequences resulting from drinking cyder kept in leaden vats; and even cyder of itself, however pure, appears to act injuriously, unless used with judgment. There is a free acid present (very different from the alkaline salt of what are called acid wines,) which must produce, when too largely used, an undue preponderance of the acidifying elements in the blood; whereas the Supertartrate of Potassa found in wines, has the elements of its complex acid broken up; while the simple Alkali resists all change, and therefore rather induces alkalinity in the system. Perhaps the effects of cyder may be obviated when the diet happens to be very rich in opposite materials; but the cyder drinking counties are, I believe, rather characterized by a poor living population; and any one who has resided in them, must have been struck with the great number of persons permanently lamed by Rheumatism. Country practitioners, while treating the disease, have often overlooked the diet; or, if they directed the diet to be altered, the patients have loved their potations more than they respected the advice.

Diseases. Results of local diet, etc.

Medicines have certainly been sometimes exhibited in such amount as permanently to injure the system. Several, who have been saved from the fatal consequences of swallowing poison, have declared. in their own language, "that they have never been the same persons since." Patients who have undergone courses of Mercury too severe, are usually aware of some persistent alteration; though this may also be placed to the account of the disease for which the metal was used. The fact is very obvious in the case of acrid, or corrosive matters; and I once observed an instance where the incautious use of Jalap, after producing a severe hypercatharsis, was followed by great emaciation, and imperfect digestion for a year and a half thereafter. It is impossible to assert positively that the Jalap was the sole and immediate cause; but it was observable, during the period of emaciation, that the intestines were very sensitive of purgatives; and, from analogous cases, I am induced to believe that the epithelium, in such circumstances, is so utterly stripped off, and the membrane beneath so injured, that it is not fit for its proper function for a greater or less period, according to circumstances. Microscopical observers state that, after an attack of Pneumonia, or Bronchitis, of a severe type, the epithelium is never renewed in its pristine perfection; and that the parts are therefore liable to be affected again, on a much slighter application of the exciting cause. What occurs on one mucous surface, is likely to occur on another. Indeed, I believe that this law of imperfect regeneration applies to almost all tissues, and it will be spoken of at greater length hereafter.

Persistency of effects from over-dozes of medicines.

Of the effects resulting from the habitual use of chemical and medicinal agents there can be no doubt. Statements are made with respect to individuals who are capable of resisting the virtues of some powerful drugs, as Morphia, Aconite, etc., etc. Such in-

Effects of their continued use.

stances only prove that every rule has its exceptions; and, if true, they are well worthy the study of the physiologist. In 999 cases out of 1000, a true drug requires no faith on the part of its recipient in order to work out the intentions of the prescriber. Where it is constantly applied, very striking effects may be produced upon the body, or parts of the body,—for the law of what is called Determination rules these substances,—a law involving some curious series of chemical affinities, and demanding the profoundest investigation from those who are competent to undertake such an office.

Law of determination to parts.

To prove the injurious consequences of the habitual use of drugs, (except where habitual disease may demand them) scarcely requires any argument. It is open to the observation of all, and is witnessed in the effects of purgatives, tonics, astringents, and especially narcotics and stimulants. The effects of tobacco, as commonly employed, are much disputed; but I am disposed to deprecate its use. Dr. Christison, in his work upon Poisons, contends against what he considers a very erroneous opinion as to the evil effects of opium-eating. His arguments are certainly sound, and establish the fact that opium is not more injurious than spirits, or other common instruments of debauchery. But there can be no doubt that opium produces such effects on the constitution, that no observer can mistake the peculiar wrinkle, and premature puckering of the victim's countenance, any more than he can fail to recognize the puffed or bloated countenance of the excessive drunkard, with his tremulous muscles, and his skin so morbidly sensitive of cold. The gangrene consequent upon the continued exhibition of

Specific consequences of particular habits.

the Secale Cornutum is not to be left out of the catalogue; and, least of all, the Delirium Tremens, so characteristic of the intemperate drinker, not to speak of the putrefactive tendency which such a habit displays under surgical or other wounds, and the happily rare and extraordinary occurrence of spontaneous combustion.

There are many adulterations in bread, in malt liquors, in wines, and in sweet-meats, that must, when persevered in, lead to chronic changes, and sometimes even induce clear cases of poisoning. As such matters must or will be taken according to necessity or taste, it is right to have some general rule that may guide us in the exhibition of them; and it appears to me that the degree of danger attendant upon them is usually to be measured by the degree of irritability which the constitution displays under successive administrations.

Rule of safety in the administration of medicines.

When the previous dose or doses have not proved positively hurtful, the succeeding ones will likely have less and less effect in the course of treatment; but when they are injurious, each future application will produce more rapid and violent effects in proportion to the frequency or strength of the impressions that have preceded it. This appears to me to be a very important truth, always to be borne in mind while directing the use of such agents. Thus we find that any new diet or new drink, however essentially wholesome, will often produce much offense and very unpleasant symptoms in the head, the kidneys, the liver, or stomach and intestines; yet, gradually, as they are again and again repeated, such feelings wear off, until the constitution adapts itself entirely to the fresh regi-

Difference between effects of heterologous agents, and offensive protein, or nutritious compounds men. In such instances, it was not so much the matter, per se, that affected the body as the sudden shock of the change. An essentially injurious agent is not so to be tolerated. No one can accustom his frame to the constant action of Mercury, or Arsenic, or Lead, until it is become invulnerable to them; and the proportional safety of all medicinal matters is to be estimated by the greater or less sensibility which the body displays under a repetition of their introduction.

Many substances may indicate that there is a decrease of the sensibility of the system towards their action up to a certain point, which is the point of safety; when, suddenly, there is an irritability manifested, which shows that the body will not tolerate more. This is well illustrated by the every-day use of alcoholic liquors. Up to a given amount, according to the kind of temperament, the brain will endure more and more the application of this stimulus; but, beyond that, its power of endurance gives way. It is a notorious fact, how small a quantity of spirits will often excite that drunkard who has overstepped the bounds of this latitudinarian moderation; and, on the contrary, I think it well established that many have indulged, during lives of the longest dates, in the habitual and pretty large use of spirits without any sensible bodily injury. The same facts may be stated with regard to opium and tobacco; facts which have given a foundation for the arguments of Dr. Christison, to which I have already alluded.

Parasites.

PARASITES.—Certain ovules, both of the animal and vegetable kingdoms, sometimes find their way to the surface, or to the interior of the human body, and there produce all the irritation that arises from a foreign substance, further increased by their degree of activity. Under this category come the three species of lice that infest the skin; the various Entozoa that take up their abode in the stomach and intestines, and other mucous passages, as Sarcina Ventriculi, Tape-worm, Round-worm, Ascaris, Fluke, etc.,—the Filaria of the aqueous humour of the eye, Trichina Spiralis of the muscular fibre, the animalcule of the sudoriporous glands, the Strongulus of the kidney, the aphthous, the favous, and the confervous vegitations, and some others, unnecessary for me to enumerate in this place. Few of these seem capable of taking up their abode and thriving in a perfectly healthy constitution, but seem to require a certain nidus, which is the result of previously impaired vital powers. To prevent a lodgement, therefore, the chief means would appear to consist in attending to all those conditions of health which have already been reviewed. But, on the other hand, they are not always to be expelled by merely resuming better habits of life. For they may already have produced such an amount of constitutional disturbance and derangement as it is impossible to allay without a violent expulsion of the disturbing cause,—after which, correct diet and tonic regimen alone may hinder any recurrence of it.

Their varieties.

Mode of induction.

Prevention. Expulsion.

Some of these larger parasites—such as the Tapeworm—especially when it acts on the sensitive and immature bodies of young children—will frequently produce such atrophy as shall simulate all the constitutional, though not the local, symptoms of pulmonary Phthisis, and so induce death. How far vegetations, of their own positive force, may irri-

Consequences.

Are vegetations equally hurtful?

tate and fatally exhaust the constitutional powers, is not yet accurately determined. It would first require to be proved that their roots could effect a disintegration of the actual tissues and secretions, instead of merely feeding on what is a morbid off-slough, as in aphtha. By whatever mode these ovules enter the frame and float along with the circulation to their respective seats, the fact of their doing so adds considerable weight to the conjecture of the cellular or nucleolar origin of local organic growths, of whatsoever nature such growths may be.

Besides these external or foreign agencies, there are internal ones which operate with equal effect upon the body, and induce its disintegration. Some of these we may briefly consider.

Retained Excretions

RETAINED EXCRETIONS, ETC.—These retentions may take place in two ways, namely: either by non-elimination at the appointed organs, or by subsequent re-absorption. The former, of course, is a more serious evil than the latter, from the very nature of its cause. They all act after the manner of poisons; but certainly not as ferments. Where changes of structure have occurred, physically preventing the escape of such matters from the circulation, the whole secret is easily unravelled on examining the dead body; but where there is a simple torpidity of the glandular function, resulting from a lesion of nervous influence, the question becomes a very obscure one indeed. It is sometimes observed, that strong mental emotions may suppress the bile, or the gastric fluids, or the perspiration; but these events will often take place without a possibility of tracing them to any individual cause. From whatever circumstances they

Their evil effects on the system.

arise, the consequences are always serious, and, in many instances, fatal. Even a suppression of the saliva impedes digestion—much more so a stoppage of the pancreatic fluid or gastric juice. When perspiration is interfered with, the consequences are in proportion to the degree in which it is retained, or the length of time during which the evil influence has been operating. When this excretion is denied an escape through its proper outlet, it attempts to throw itself on the involutions of the mucous surface, and thereby excites upon that surface an irritation corresponding to its amount. An increased diuresis, and perhaps expectoration, follow; and, if these be not equal to the occasion, then there are the symptoms of Catarrh, or Bronchitis, or Pneumonia, or inflammation of the joints, kidneys, or intestines; and, in debilitated habits, Phthisis Pulmonalis itself. Perhaps, indeed, nine-tenths of the non-specific constitutional disorders owe their origin to the suppression of perspiration.

Retained bile and urea.

Similar observations are applicable to the diminution or stoppage of the escape of carbon from the lungs. The lethargic, and ultimately mortal, effects of non-eliminated bile and urea are equally familiar to us. Nor can we doubt, from all these observations, that many shades of disease arise from the altered condition of other glands, not of less importance, though of less bulk. The constitution and the odour of fœcal discharges are very variable in sundry ailments; and it is often in their alteration alone that the ailment essentially consists.

There can be little doubt that, in these circumstances, the contents of the smaller glands are either changed in quantity or quality. The determination of morbid action, in many cases, to the little patches that are scattered here and there on the intestines, and to the solitary glands, and them alone, indicate that they play some very important part in the animal economy, though that precise part be yet unknown. Not an unfrequent cause of increased and, ultimately, retained excretions, is the habit of throwing into the system more materials than the living laboratory is capable of appropriating. The bowels often afford a safe escape for the residue, but not invariably; and the skin, the kidneys, the liver and lungs, all become equally oppressed with their loads, which they cannot always shift to one another. Loss of appetite generally steps in as a safeguard; but, even in that case, nature's lesson will too often be disregarded; and spices, and pickles, and sweets, and liqueurs, are called in to complete the work of self-destruction. This melancholy fact is most illustrated in those inhabitants of cold climates who resort to hot ones; but examples are not wanting among the wealthy and indolent of our own great mercantile towns. Temperance and exercise are the grand prophylactics.

Evil effects of over nourishment.

Bile, in one sense, an excretion.

I have included the bile in this category; for, though it be not strictly an excretion as regards the system, it certainly requires to be duly *excreted* from the blood and the liver. Therefore I have not sought, in considering these actions, to draw any very nice distinction, seeing that the hepatic secretion produces all the consequences of an effete retention, whenever it does not pass through its natural stages of mixing with the chyme, and proceeding to decomposition in the lungs, etc.

Homologous Deposits.

Homologous Deposits.—These embrace every formation or deposition, the composition and structure of which are similar to any of the natural tissues. They are of two orders, the one consisting of those hypertrophies, where the cells are laid down in juxtaposition with others of their own kind; the other of those unnatural replacements where cells of one kind are ingrafted upon, or occupy the position of cells of a different nature. Perhaps it might be proper, also, to add a third, where no one organ is either increased or replaced; but a simple independent tumour is brought into existence, occupying its own separate site. The laws that regulate such actions are well worthy of the closest attention.

Their classification.

The task is a very difficult one; because the only chance of success consists in being able to apprehend the first link of the chain—the earliest germ of that morbid birth whose after-growth is not so great a secret; at least, not a greater one than the growth of the natural tissues, while its first beginning is often wrapt in as much mystery as the evolution of the ovum itself. Both, perhaps, in their ultimate causes, are utterly beyond our grasp; but, as we know something of the conditions necessary to the efficiency of those causes that develope the ovum, so may we hope to know something of the conditions necessary to the commencement of morbid growths, and thus obtain a control over them.

Their origin and nature.

Most of the simple hypertrophies appear to be the result of an additional determination of blood to any given part; either due to some previous irritation, or merely owing to the stimulus of exertions too heavy to be easily endured; yet not heavy enough to overcome reaction. It is, in fact, reaction to too great a degree. Instances of this are presented in the hypertrophied skins of those engaged in rough trades, in the muscles of athletæ, in the livers of gourmands, and in the hearts of persons in whom the circulation has been obliged to be sustained by preternatural efforts on the part of that organ. Such additions to the bulk of natural structures are generally effected by means of very gradual exudations, not beyond the assimilating powers of the surrounding tissue, which, therefore, metamorphoses every slight infiltration of plastic lymph into a texture identical, or nearly identical, with its own. When the exudations are too abundant they usually degenerate, and ultimately lose their vitality: being either broken up into a granular fluid, and so reabsorbed, or else passing into pus, or any of its gradations down to tubercle. Yet, sometimes, there are masses of blood or fibrine thrown out, which forthwith assume to themselves an independent, vigorous existence, generating blood vessels of their own, and attaining a most extraordinary magnitude. There are other cases, where the deposits are effected not by any stimulus, but by the simple superabundance of their proportion in the blood. Such is that of fat, and perhaps the fibrinous effusions of certain dropsies, as well as those of that peculiar plethoric inflammatory fever, which some have termed Arteritis. There are likewise depositions of pigment matter, at one period considered malignant, but now regarded as only an occasional accompaniment, and not an essential ingredient, of any malignant tumour or sore. Moles and freckles are very familiar instances of this, and

Mode of deposition.

Their future stages.

I have observed, in a lady of some Indian blood, that she scarcely ever receives a bruize or abrasion but there supervenes a very black pigmentary secretion, which remains under the skin as a permanent mark thereafter. Of the misplaced homologous depositions, we have abundant examples in the ossification of cartilage, tendon, and fibrous membrane, in the sebaceous metamorphoses of the liver and kidneys, and, more rarely, in the cartilaginous changes which sometimes overtake the testicle, the mamma, and some other glands. Besides this morbid developement of individual tissues, we occasionally discover the formation of entire organs, as teeth, or hairs—in all their complexity of structure—brought into existence in the ovary, before impregnation, or even menstruation, has occurred; and in the male also, within the mesentery, the orbit, the mediastinum, etc.

Their occasional complexity.

The question now naturally arises as to how these things come to pass. We look for the first link of the morbid chain, because we believe that, by ascertaining its nature, we might devise some means of checking such growths in the bud. In searching for it, however, it behoves us to be exceedingly cautious, lest we mistake something for the first link, which is no link at all. One or two facts are ascertained which so far guide us in the inquiry. In the first place, the deposits or formations are always analogous to those of the organism in which they exist. Wool, it has been observed, and horn, properly so called, are never found in the human body; neither is human fat ever formed among the tissues of the sheep. It is veritable human hair, and veritable human teeth, that are ever developed in the ovary of Woman. This, therefore, proves

Theories of depositions and formations.

that they are not the result of a sportive dance of atoms; but a simple perversion of the identical laws, which govern the rest of the individual system. It is also observed that none of these productions ever exist, without the previous developement of that nidus or matrix which always precedes, and accompanies, them in their normal growth. Thus, fatty globules are subject to the pre-existence of fat cells or glands: bone owes its deposition to the matrix of a preceding cartilage,—hairs arise from a cysted cuticle, similar to that of the surface, and the tooth of the ovary springs from a genuine tooth-germ and tooth sac. This further proves that all of them commence their existence in the form of a minute germ or centre of specific action, which, in process of time, appropriates to itself the surrounding fluids, and so runs the same course that it would have done in its natural situation. Now, is this germ generated on the spot of its future existence by some perversion of function? or is it absorbed from some tissue where it should naturally be, and transported by the current of the circulation, to develope itself in some anormal quarter? It is a difficult question to answer; but, however it may be, all replacements of texture seem to depend on a certain degeneration of the vital powers of that tissue which yields ground; and it is equally true that the gaining tissue is always the lower one in point of organization. We see glands give way to cartilage, and fat—muscles to areolar texture—and true skin to an amorphous incrustation; but we never witness areolar tissue exalting itself to the condition of muscular fibre, nor muscular fibre assuming the complex action of a gland. There appears to occur, therefore, a de-

Their origin in germs, or nucleoli, ovules.

The translation of germs or nucleoli.

Morbid depositions displacing healthy structure.

Referred to imperfection of plasma.

pression of the higher energies, or a deterioration of the higher plasmata, beginning, perhaps, either with the irritation of a foreign body, or with inflammatory action, or with a deteriorated condition of the nutritive fluids. Under such circumstances, we can readily suppose, how a lower texture may be generated by the inferior plasma thus poured forth; the lower texture attracting its own peculiar elements, so as gradually to press upon the weakened healthy tissue, and cause its partial or total disintegration. The latter, in such a case, not finding in the blood its due plastic support, is unable to bear up; while the former, meeting with abundance of its humbler materials, is strengthened in its encroachments. Hence we often find an alternation of victory and defeat, so to speak, during the contentions of these perfect, and degenerated structures. As the nutritive qualities of the blood, and the general vigour of the system diminish, these latter structures increase, and as the blood improves, the former regain their lost ground. Hence the benefit of tonics in all such degenerations, and hence the spontaneous disappearance of Morbus Brightii, enlarged liver, and even what have been judged to be malignant replacements, under no other conditions than a cautious and invigorating mode of life. The results of those experiments which have been carried on, in some of the Austrian and other German Hospitals, with regard to the treatment of ulcers, are here worthy of being noted. The constitution of the subjects of such ulcers being kept in a state of perfect calmness and quietude—or, so to express it, subdued tonicity—while the local action was kept under by constant droppings of cold water,

Possibility of regeneration of healthy tissue.

and nothing more, it has been declared that the reparative process has terminated, not, as is usual, with a formation of simple areolar tissue, but of veritable muscular fibre. This is in keeping with the known powers of complex reparation which characterize the colder-blooded animals; though it is scarcely allowable to infer from one kind of organism, what may be the case in another; and, therefore, we must fall back on the general principle, that the lower the temperature the less will be the exudation; while the smaller the amount of exudation thrown out, the higher will be the organization it assumes. What those minute changes of the blood really are which lead to the first minute changes in the textures, the state of Chemistry does not enable us at present to decide; but it is an inquiry deserving every encouragement. I have stated my views with regard to structural degeneration, and consequent change in the appropriation of particles, as commencing with some irritation, or hyperemia, that prostrates the vital powers, so that a degeneration, and not a simple hypertrophy, ensues. Yet I cannot disengage from my mind, the possibility, also, of a translation of germs or nucleoli; especially when I consider the parrallel cases of the vicarious discharge of the menstrual flux; the absorption and re-deposition of pus; and, also, the free passage through the body of cancerous, and other, cells. As to the atoms of the colouring matter of madder, Mercury, and such chemical agents, they may find a passage anywhere, as they appear to be reducible to an infinity; therefore, their penetration into the recesses of the system do not affect the question; but the very complex and weighty atoms,

Translation of germs or centres of cell growth re-considered.

or, I should rather say, the ultimate germinal granules, of pus and cancer are in a different position; nor can we be prepared to deny the possibility of the translation of the germinal nuclei of cartilage, or fat-cells, or teeth, or hair, until we prove the germs of this latter class to be larger than those of the former. Moreover, it has been established that some Entozoa, that may be perfect in one animal, may also arrive at a certain grade of developement, or their larva state, within the body of another that preys on it, though the growth goes no further. The ovules are also found circulating in the foreign blood. The test of microscopic measurement might lead to a knowledge of the relative penetrability of certain tissues by certain germinal cells, or atomic centres of growth; and thereby explain how one part of the body is most subject to one deposit, and another to another.

Heterologous formations, etc.

HETEROLOGOUS DEPOSITS AND FORMATIONS.—These include all matters that have no resemblance to the natural structures of the body. Many growths that commence with an homologous character, do, in course of time, assume the heterologous aspect, which may be of two kinds; that is, they either may be contained in distinct cysts, or, at least, have some distinct line of demarcation; so that they are pushed to the surfaces, and thrown off as inert excreta; or else they are distributed irregularly through the healthy texture, and possess a short, but most productive, cellular existence; and even when they open on the surfaces, the destruction of the old, is never equal to the renewal of the young generation. The first class appear to be simple depositions of deteriorated lymph, as ichor, tubercle,

Their general classification.

First Simple.

Second, Malignant.

or pus; the second are active perversions of the cellular formation, proceeding to occupy the place, and swallow up the nutriment of the normal tissue, with a march so certain and irresistible, as to be denominated, in an emphatic manner, malignant. These constitute the varied forms of cancer.

Theories of the induction of heterologous deposit considered.

From pressure.

From continued Hyperæmia.

From simple negation of vital power.

The origin of extraordinary growths, of whatever nature they may be, have, as we have seen, been attributed to sundry different causes. They have been referred to hyperæmia alone, to simple deposition of degenerated fluids, to perverted functions, and to cellular inoculation. Many have sought to trace them to slight injuries, as pressure, or a blow, or the presence of some foreign substance; and each suggestion demands due consideration. There can be no doubt that hyperæmia, and especially venous congestion, does, by weakening the tissues through its increased pressure, and, at the same time, gorging them with a sluggish and vitiated fluid, tend to the ultimate formation of a deteriorated structure which, once created, may proceed to other metamorphoses still further removed from the standard of healthy action. Few, I think, deny that some, even of the most indolent chronic growths, have their commencement in a sub-inflammation, and occasionally, also, in one more acute. It is equally true that the blood, and other fluids, may degenerate, from a variety of causes already enumerated; and that they may then be liable, on the very slightest irritation, or none at all, to pour through the eliminating membranes, a pseudo-plasma, instead of true lymph, which, neither by its stimulant power, nor its chemical constitution, is capable of being moulded into natural tissue. Nay, the very matters deposited have themselves been found ready formed in the blood. This is a source, therefore, which must be admitted into the catalogue.

From perverted function.

Perverted function is a more obscure question; because we really cannot detect what are the actual modes of action at the extreme verges of the capillary circulation. All that is suggested on such a point must, as yet, be pure conjecture. The potency of those hidden powers or laws, which constitute the essence of functional action, has already been admitted, and we have seen how a mere emotion or idea can control its manifestations. But in by far the majority of instances, I believe that these functional actions are chiefly affected in a secondary manner, by means of material agents acting on their natural organs; and so depriving them of the instruments with which they effect their designed ends. These material agents may often be so minute as to baffle demonstration; but we can commit no error in still looking for them.

Functional derangement generally attributable to previous organic change.

Cellular inoculation reconsidered.

The theory of cellular inoculation carries us further forward in this argument. Of its truth, in certain cases of infection, no one can entertain any rational doubt. It is a fact demonstrable by experiment. But whether it is applicable to all other diseases is another consideration. Amongst many of the vulgar, and, it may be, a few of the educated, there exists a belief in the translation of tubercle and other scrofulous matter, from one body to another; so as to propagate a similar kind of diseased action. The Linnæan theory of animalcular ovules as being the cause of all morbid action, gave great encouragement to this notion; though Linnæus himself always presupposed a certain condition of the

Animalcular ovules.

body as affording a fit nidus for their incubation. Not a few of the learned are still contending for the vegetative or animalcular derivation of cancer cells; nor can we presume to say that minds of such an order have adopted the belief on contemptible grounds. The peculiar forms of such cells, their surprising powers of generation, the vigour of their collective vegetative growth, not only irrespective of the vigour of the whole constitution, but in direct proportion to its weakness; all afford them very rational grounds for, at least, pushing their investigations towards that point.

Their ovular theory rejected by experimentalists.

Others have sought to controvert this idea, by inoculating dogs, etc., with millions of cancerous cells, without producing any morbid results; and they have rather sought to trace the early commencement of such ailments to the almost imperceptible organic irritation, accruing from the presence of some substance introduced from without, or issuing from the seat of a blow, or long continued pressure. They instance the facts of pins or globules of Mercury forming the nuclei of heterologous growths; of blows, being followed by a common swelling, which next became schirrus, and ultimately cancer;—of the pressure of even a tobacco pipe in the mouth, leading to a distinct localized malignant tumour; not to mention the fact that such formations are most apt to occur in spots subjected to the conjoint influences of pressure and constriction: as the pylorus, the rectum, and the os uteri. I do not think, however, that we are entitled to accept these mechanical lesions as the sole causes. If they were, we should have much more malignant disease than there really is. It certainly is, however, on many

Long continued irritation.

Not sufficient of itself.

occasions, one of the conditions. When cancer cells have been introduced by inoculation, sufficient attention has not been directed to the other conditions of the frame. It may be said that a cell will settle for propagation, where it finds the fit material of a nidus. Yet we have no distinct proof of cancerous, or other such sores, ever proving contagious, even under the most concentrated exposure; a circumstance that leads to the impression of their non-ovular origin, though we are equally at a loss to account for any other. The whole question is involved in deep mystery, and is open to investigation, in each or all of these paths. Chemistry, as yet, affords us but little assistance in the pursuit. It cannot, with nicety, determine the balance of affinities, either in morbid or healthy atoms; and, unless determined with utmost nicety, the results are of little avail; since the changes of quality and structure, are found to be dependant on chemical changes so slight, as to be at present actually inappreciable.

Possibility of a conjoint influence, between organic lesions and ovular depositions.

Rather a startling consideration is the fact of cancer being more prevalent in the country than in towns. This statistical statement jars with the idea of its being connected with a deteriorated condition of the blood. Possibly it may depend upon the circumstance, that women, who are chiefly its victims, are less efficiently managed during parturition, etc., in the country than in town; though I have had no means of minutely examining the returns, and therefore only hazard a conjecture which, I think, has probability in its favour.

Conjecture as to cause of the greater prevalence of Cancer in country than in town.

The non-malignant heterologous matters are involved in somewhat less obscurity. Pus is generated

Pus and Tubercle.

Connection of Tubercle with deficiency of the red globules, and general weakness.

from lymph, under the influence of exalted vascular action; while ichor and tubercle result from a diminution of the reactive vital forces. The latter have always a very close connection with the deficiency of red particles in the blood. There is an obvious depression of nervous energy, and an equally obvious degeneracy of the whole fluids. Wherever it exhibits itself, it is an evil omen of the previous habit of body. When it fixes on such a vital organ as the lungs, which cannot repose or be shut from external irritation, we must anticipate, from the very nature of its origin, and scarcely organizable form, that the prospect is a very hopeless one. Yet, on considering the fact that, in numerous organs of the body, and not unfrequently in the lungs themselves, proofs are multiplied of the discharge or re-sorption of tuberculous matter, with subsequent healing up of the seat of ulceration, and complete restoration of the general health, we cannot consent to class tubercle among the utterly malignant formations, at least not along with cancer.

Its spontaneous disappearance.

Its curability by art considered.

With regard, indeed, to the curability of Pulmonary Phthisis, we are to bear in mind how many dead bodies we see, with cretaceous depositions in the lungs, around which the tissue is puckered as in old scars. Dr. Baly has ventured to say that he has seen several cases in the Penitentiary, apparently hopeless; yet rapidly recovering after liberation, and even on the first intelligence of intended liberation. An exception might be taken to this conclusion, on the ground of that Physician mistaking, perhaps, the nature of the cases: but much weight is to be allowed to the opinion of those who have such a field of observation as a long-term Prison, such as the Penitentiary, affords; when we consider that the number of pardons or deaths on account of tubercular degeneration, are, in an increasing ratio, according to the length of time to which the victim has been exposed to the depressing causes; as, during confinements of one year, 6 per cent—two years, 15 per cent—three years, 31 per cent—four years, 45 per cent, and five years, not less than 56 per cent. Dr. James Hope also exhibits, in his book of Morbid Anatomy, a cavern as large as an orange covered over with healthy mucous membrane, which cavern had been the result of disease four years before death—the death being due to another cause.

Effects of Ferruginated and non ferruginated diet.

It is, perhaps, proper to notice again in this place, those experiments of Mons. Coster, in respect to the influence of Carbonate of Iron over the developement of tubercle, when, having confined a number of dogs and apes in cold damp cellars, he found that those that had not ferruginated food, became tuberculous, while such as had it, escaped. We know how very quickly a pale countenance is influenced by the use of Iron. We also know how constantly the deficiency of Iron is connected with the tuberculous diathesis. Whether the want of Iron induce the diathesis, or the diathesis cause the non-elaboration of Iron is difficult to decide; but if, in any case, we find two things always co-existing; and if the removal of one cause the departure of the other; and if, at the same time, we can remove one, it is a valuable fact, be the theory what it may. So far as my own experience goes, I should say that the Cod-liver Oil never exhibits such marked effects, as when it is given in con-

Iron in conjunction with Cod-liver oil, etc junction with Iron; and along with such other remedies, as the different symptoms of incipient Phthisis would point out to the Physician, as expectorants, blisters, Sulphuric Acid, or Digitalis, according to the attendant circumstances.

The Hectic Fever, arising from absorbed pus, is similar to that which arises from tubercle. It may be lingering, and it may be ultimately subdued; or, it may be exceedingly acute, and rapidly fatal. Dr. J. Y. Simpson relates a very remarkable case of this kind; one of Mastoitis, where matter was generated to a vast extent, and, being reabsorbed, led to the most alarming symptoms. Mr. Syme laid open the abcess, but there was no abatement of the constitutional disturbance. Dr. Alison conceived it to be a case of general Rheumatism.—However, death followed, and, on examination, the whole of the joints and several other parts of the body, were infiltrated with pus.

Calculi, and other Urinary precipitates

The deposits, or precipitates, whether homologous or heterologous, which are called calculus or gravel, cannot be excluded from this review of morbid departures from the primitive type. They are invariably due to errors of digestion, aided, sometimes, by an acquired evil habit of body, transmitted from one generation to another. Their formation is so clearly of a chemical character, that they are all reducible to the one idea of comparison of increment with excrement. Urates, Oxalates, or Phosphates all depend on this relation of food to the digestive conditions. The lowest degree of oxygenation appears to give rise to the Uric acid, and hence the deposits of Urate of Soda in Gout induced by indolence, or the intemperate use of hot,

Referred to nature of increment as compared with excrement.

dry liquors. A somewhat greater, but yet insufficient, oxygenation, promotes the Oxalic Acid tendency, while full oxydation completes the production of soluble Urea. These effects have their origin partly in the food, partly in the state of the stomach, and partly in the activity or non-activity of the lungs. There are certain districts where the worst constitution will scarcely take on either Rheumatism, Gout, Gravel, or Stone; while there are others where the best will not escape some one of them. The drinkers of Rhenish wines are said to be entirely free from Uric formations. Cyder consumers, certainly, are liable to such complaints; and, indeed, almost every country is prone to certain urinary deposits, precisely corresponding to the chemical composition of the food on which they generally live.

Mellitic effusions.

The mellitic effusions of Diabetes come under the same category. They may be increased or diminished according to the proportions of saccharine elements administered with the food; although the primary origin of such a diseased tendency is more clearly attributable to a perversion of the function of digestion, than to any habitual indulgence in particular kinds of diet. It may be objected to Sugar being considered a heterologous matter, from its natural existence in the nutritive fluids, and in the milk. If not a heterologous, it is, at least in such quantity, a misplaced matter, and generally seems to proceed with a malignant tendency, apparently attributable to the simple diminution of nutrition. Hence, Phthisis is no unfrequent consequence of a continuance of this perverted, or perhaps, only arrested, action of the digestives. Where nutrition is checked at its first stage, we must anticipate a general degeneration.

Their consequences.

I have been, thus far, attempting to indicate, firstly, the principles upon which the healthy condition of the human body depends; and, secondly, the nature of those agencies which tend to deteriorate or pervert its operations, and so reduce it to a state of disease. The attention is now to be directed to a consideration of the law or laws which constitute the principle of Reaction,—a principle by which the organism is enabled to withstand the assaults of evil influences, and to retain, or regain, its natural equilibrium of affinities, in spite of efforts made to overcome it. All states and stages of diseased excitement have, by some, been viewed as reaction in a certain sense, that is, as an attempt of nature to cast off a grievous burden, and, therefore, a system of Physic has been founded on the supposition that it is best, in curing a disease, to increase its symptoms. So far, and, in some cases, this is an expression of the truth, as we frequently second the natural efforts by administering a stimulus similar to the original exciting cause. But it cannot be accepted in its full extent; for there appears to be a certain point or acme, beyond which, reaction ceases for any useful purpose, and becomes ineffectual in its efforts. Morbid action reigns paramount, and, though the vital organs may continue to struggle for a time, their influence has ceased to extend to the extremities of the circulation. The vital forces recede, and physico-chemical, or parasite invasions, effect their destructive marches. Changes do occur; but they are not the efficient, or truly reactive changes that tend to the restoration of health. On the contrary, every alteration that takes place, is for the worse. This is exhibited in a slow form

Reaction, Its nature.

May overcome injurious agencies.

Or be over come by them.

under degenerative, or malignant disease. A more rapid, but localized example, is afforded in the progress of gangrene—and, in some cases of sudden shock, the power of reaction seems altogether, and instantaneously extinguished; as in nervous poisoning, or in extensive, pungent scalds, inducing death, but not the slightest blush of inflammation.

Forms and degrees of Reaction.

Reaction may exhibit itself in sundry forms, according to the nature or degree of the exciting cause. The simplest manifestation is where it acts without our consciousness, the system repelling, or casting out, or decomposing, or amalgamating to the nature of its own tissues, any given agent calculated to injure, and, with an ease, that prevents any knowledge of the effort from reaching the sensorium. This, I conceive to be usually the case with those frames of extraordinary vigour that can thrive under almost any diet, and walk unhurt through an atmosphere of pestilence. A more acute manifestation is witnessed in that sense of uneasiness, or pain, which follows the application of any hurtful body. This we have in all its degrees. There may be a pang, or a dull weight, or a sense of rawness, or an indescribable discomfort, or there may be thirst, or a shiver, or nausea, or sneezing, or griping—all mere nervous reactions. Those of a vascular nature may follow or not, as the case may be. If they do, they exhibit themselves only, perhaps, in a reparative determination of blood; but, generally, that blood will proceed to throw out an effusion of protective fluids, as around foreign substances, or into the nose, bronchi, or bowels, after the introduction of irritative agents. The reaction may further proceed to the stage of inflammation; leading

Its various stages.

to the formation of a temporary tissue, or coating of fibrinous lymph, which, according to favourable or unfavourable circumstances, may either form a simple eschar, as it were, protecting for a time the tender surfaces beneath it, or else undergo a metamorphosis into pus; in either case suffering, in due course, a solution of continuity, and carrying along with its detritus the offending irritant, if it should still remain.

Special seats of Reaction.

There are special determinations, peculiar to certain irritants, which excite violent reaction within particular organs, as the skin, the liver, the kidneys, or the bowels. But their operation may sometimes prove of a sluggish nature, inducing dull irritation, or oppression, but no acute reaction. It is in such cases that the homœopathic treatment (in its strict sense) is sanctioned by reason, and we use artificial excitements "similia similibus," so that, by increasing the stimulus, both the drug and the sub-irritating matter may be excreted at the same time. As to the infinitesimal doses of this so-called system, these have no essential connection with its fundamental theory; but whatever success is traceable to them, is simply owing to the old established principle of scientific Physic that, while foreign matter of great amount and potency is ejected rapidly by a violent effort of the first passages, and so prevented from penetrating much further, very small doses, on the other hand, are permitted to pass them, and insidiously penetrate, along with the current of the circulation, into the farthest recesses of the system. Thus Mercury, in large quantity, is cast forth by the intestines, while, in smaller doses, it remains to produce salivation; or Antimony will, in certain quan-

Foundation of Homeo-pathic Theory.

Infinitesimal doses considered.

tity, cause vomiting and purging; in a lesser, prove diaphoretic; in lesser still, expectorant; or, like Mercury, etc., simply alterative, as the phraze usually goes, whenever any medicament exercises its influence through obscure channels. With regard to the notion of the decillionth of a grain exerting any apparent energy, it appears a puerile absurdity. Did it do so, we should all of us be constantly under the influence of medicinal agencies; as neither the matters that we eat, or drink, or breathe, can ever be so pure as not to contain such inappreciable proportions of almost all the elements in nature.

General Reaction.

These efforts are of local extent; but there may be an universal constitutional reaction, and that mode of manifestation is exhibited in the courses of Fever. This seems to be immediately due to the state of the circulating fluid; though, remotely, it may have owed its origin to impressions on the nervous centres. The nature of such an action, whether fermentation or not, has already been sufficiently dwelt upon, and the remarks, in this place, need not be extended further. It may only be observed that reaction, under this form, is often over exalted, or, on the other hand, so greatly depressed, that the only hope of safety consists in goading on the contractions of the Heart by the most potent stimuli, so that it may continue its pulsations until the poison shall have spent its specific force. Most febrile actions are limited in their duration, because the poisons that induce them are limited in their influence. But Hectic, as it depends on chronic causes, is persistent according to the persistency of its origin. We have no remission from the irritation of confirmed Phthisis, or encephaloid, or permanently

Reparative Reaction.

Ineffectual Reaction.

vitiated fluids; and, therefore, the Hectic, in such cases, is no efficient reaction; but only a bastard simulation of the truly reparative fever.

Translation of Reaction.

The effects of reaction from the operation of agents applied internally, may often be exhibited on the skin, as is witnessed in sundry eruptions: on the other hand, agents may be applied externally, as cold, heat, or moisture, which shall display their energies on the mucous or serous membranes.

Phsychical Reaction.

Its morbid effects.

Theory of its action.

The fact of mental reaction is very familiar to all, both in its attractions and repulsions. Love begets love; hatred, hatred; pride, pride. Difficulty of advancement, under certain limitations, rouses to effort; opposition, under the same limitations, increases it. The fear of defeat incites our entire energies, and even the certainty of it may call forth a superhuman display of courage and skill due to desperation alone. Yet, it may, as already observed, be totally annihilated, by an overwhelming mental shock, or worn out by a succession of petty distresses, leading to dull indifference, or apathy, or idiotism itself, as the case may be. Those who have made the morbid condition of the human mind their particular study, will doubtless be prepared to give as many examples of varied mental reaction, as we offer of bodily reaction; but, as it is a peculiar walk, I abstain from entering into it at length. It devolves on me, however, to state my general opinion of these phenomena. I conceive then, that every impression made on the sensorial centre, arouses a correspondent reaction, which must be animated by one or other of two feelings, namely, desire, or aversion. If the reaction be simply commensurate with, or only slightly within or beyond the magnitude of the exciting cause, it is pronounced healthy; but if it be out of proportion to it, or continued, by a sort of internal ferment, long beyond the time that the external cause should have ceased to operate, then it is pronounced unhealthy. Diminished reaction will proceed from diminished sensibility; and increased reaction from increased sensibility, this vital quality of sensibility being in itself simply an ultimate fact. On the increase or diminution of this quality, depend the different manifestations exhibited in acute mania, or in melancholy, or in idiotism; but in all such cases it must have led to the prostration of self-control. Images, or ideas, may be impressed with such force, that they create a sort of convulsive action in the mind, so that a fixity of exalted or depressed feeling is induced, that shall be permanent, and to the perfect exclusion of all other images and ideas; or else so paramount, as to modify and distort any new ones that may be admitted. Idiotcy, on the other hand, is a negation, or rather obscurity and incoherence of ideas, so that the victim is almost exclusively governed by mere instincts, which, in their nature, are incompatible with the self-control which belongs to rational reflection. As delirium is a sort of temporary mania, so mania is a permanent delirium. If the preponderating image or images be desirable, the delirium or mania, is a happy one; if they be objects of aversion, then it is miserable. So far as we know from dissections, such results may arise from perverted function alone, or they may be traceable to the irritation of poisonous matter circulating in the blood, as in fever, and under alcohol, and certain plants; or to acute inflammation, or congestion, or

Self-control the essence of Sanity.

Causes of mental disorder.

Principles of treatment.

anœmia, leading to increased or diminished pressure on the brain. If dependent on perverted function, we can but seek to remove the exciting causes, and employ sedative measures; if on poisons, to expel them; if on inflammation, then local antiphlogistics; if on congestion, a course of tonic and stimulant purgation; and if on anœmia, nutrients, with rest. Each course of treatment would, of course, be modified by those multitudinous considerations which a Physician alone can duly estimate; but, as the grand object is to re-establish self-control in the disordered mind, each attendant must, at the same time, set an example of the exercise of that prime virtue, and attempt by every means to induce it in the unhappy patient.

Reaction worn out by slight continued irritations.

The powers of bodily reaction, in like manner, are often completely overcome, not by any sudden or violent assault, but by continued slight irritations, that exhaust without exciting the system. Efforts are thrown away, and the strength is gradually drained off in small currents by sluggish and ineffectual stimuli. This is exemplified in protracted parturition, according to all accounts, more strikingly than anywhere else. The truth is, that nervous power may be worn out in the mere regulation of motions, or attention to sensations, however insignificant they may individually appear. Hence the fatigue consequent on very slow walking, or in continuous irksome attention to trifling things, or on afore-mentioned slight bodily irritation, or mental anxiety.

Where effectual Reaction stops, and apparently

Where true degeneration or perversion commences, effectual reaction may be said to stop. This is the general fact. Hence there is but little of the healthy effort supervening upon extensive tubercle or cancer, its only representative being a hectic excitement that scarcely deserves the name. Yet even this serves to indicate the innate tendency, though not the ability, of the system to regain the primitive type, under circumstances the most adverse to its success; and proofs are not wanting that that success has sometimes been attained in a manner that has satisfied the senses, and the understanding, though reason has been baffled in her attempts to explicate the mystery.

irretrievable disease begins.

Nature even here can sometimes rally

Thus much for natural reaction—the working of which always affords us the best index in the treatment of disease. Physicians are the priests of sanative nature, and they have an entire faith in the directive wisdom of her efforts, which, though they may often faint, never go astray. It is under the recognition of this fact, that we speak of aiding nature in her endeavours, and so humbly follow in the wake of that "vis medicatrix naturœ," which has been admitted from the earliest to the latest times. Artificial contrivances, therefore, in aid of her failing powers, constitute the essence of our healing wisdom. By the study of nature, in all her phases, we are enabled, in some degree, either to ward off evil influences, or check their operation after engraftment. In this way, we may annihilate the conditions upon which the existence of any given miasm depends, or we may wield one agent of a given peculiar nature, to counterbalance another of contrary tendencies. These two facts require no illustration, as the mere mention of them calls up numerous instances. But while those instances are so many, we cannot shut our eyes to the unhappy

Mode of Reaction the guide to physicians.

Necessity of studying its reparative means.

truth, that they are yet by far too few, and that many secret agencies of the deadliest kind, can neither be identified in their generation, nor counteracted in their march, but remain as stumbling-blocks to the faculty, and curses to mankind.

Difficulties of that study.

It must be confessed, that of all the studies to which men have bent their attention, those connected with Physic, in its philosophical acceptation, have proved the most difficult and mysterious. The mind can with much more ease perceive the relationship of mathematical truths, as to number, size, form, and weight, even on the most unbounded scale, than it can grasp the connection existing between intellect, and nervous force, and vital organic chemistry, in all their surprizing manifestations of growing, and creative power. Human skill has weighed earth, and measured air, and traced the courses of comets, and of so-called fixed stars, before it has almost advanced one step in the knowledge of that link which joins mind or vital principle to matter. Geologists now feel themselves pretty competent to indicate the courses of the events of ages; although not one operation has been witnessed in their lifetime; but physiologists are involved in darkness, although millions of living structures are renewed before their eyes every year.

Our opportunities of daily witnessing the renewal, and gradual decay of our object of study, as compared with those who dwell on things that are for ever past.

Encouragement from late advancement and attainments in Physic.

Yet this very fact of the opportunities presented for actual observation should so far encourage us. It is undesirable to declare anything in nature an absolute mystery. We may never arrive at the ultimate cause, but we may come a little nearer to it. Nothing better illustrates this than our late advances in Chemistry, by which the operations of certain organs are now reduced to the most accurate calculations, which formerly were considered as hidden mysteries. In like manner, as Bacon has observed, nothing more impedes the improvement of Medicine, than dogmatic declarations of the incurability of this or that disease. Many, deemed incurable of old, are now subject to the most simple treatment, and there can be little doubt that, as we advance in our knowledge of the laws of the economy, and of the properties of external matter, many that now baffle us, will be placed under some control. Even the apparently hopeless condition of Cretinism has lately been proved to yield, in some measure, to a judicious course of treatment. Dr. Guggenbuhl, with a self-devoted philanthrophy beyond all praise, established himself, some time ago, in the Alpine vallies, with the resolution of giving a fair trial to those measures, moral and physical, which were deemed capable of regenerating those wretched and disgusting specimens of human-kind. Not by any heroic remedies—except the heroism of patience—but by simple and persevering attention to the nature of the food, to exercise, to cleanliness and warmth, combined with that untiring assiduity in mental culture, (bearing with apathy, and encouraging every ray of understanding with an equal spirit) which christian charity and a God-like love could alone exercise, have these beings, in many cases, been redeemed from the abyss of brutality, to a condition of comparative comfort and intelligence. This certainly encourages effort in cases less hopeless.

Dr. Guggenbuhl's treatment of Cretinism.

Its effects.

It can admit of no question that, even in the best ordered human society, a vast amount of disease is directly attributable to an ill-regulated condition of life, and insufficient attention to the general means of health. By due measures, this evil might

Much disease attributable to causes under our control.

be diminished, or altogether averted. Doubtless, every one entertains his idea that there is a necessary weight of sickness imposed by Providence, upon mankind, and which, at a certain point, is incapable of reduction; but we as certainly know that our self-entailed sickness is capable of a reduction by self-exertion, and we must not presume to place any limit to that reduction, until we have exhausted all our possible exertions. In the survey which we have already taken of the rise and progress of diseased action, we have seen how many of its causes are dependent on accidental combinations of circumstances, and how the Physician is able, in some measure, to indicate the prevailing ailments of any given district, simply from examining its physical and moral condition. We have reviewed the characteristic complaints of countries, and parts of countries, towns, and special portions of towns, of the labouring classes in general, and of persons in particular walks of labour. The whole has tended to localize specific diseases, and to point out the possibility of eradicating, or at least diminishing to a very great degree, some of the worst scourges of society, provided we only bind ourselves to remove those more obvious conditions on which their generation and extension certainly depend.

Remedial measures.

To do this effectually is, generally speaking, far beyond the powers or opportunities of any single individual. It requires combined and systematic effort of the most enlightened kind. Such endeavours have sometimes been made, and their benevolent objects been defeated, by the ignorance that directed them; a result, that has been calculated to cast discredit upon future operations, even of a wiser

Great remedial measures beyond the power of individuals. Private bodies of men have often failed.

character, in the eyes of those who are incapable of judging of them except by the result. Often, also, these endeavours have been dictated by but one or two narrow notions,—the whims of particular minds, and altogether insufficient to meet the mighty demands of the case. It is needless to multiply instances of such ineffectual propositions. I may only allude to the failures of those who were wont to believe that free ventilation, and ventilation alone, would scatter every pestilence. The magniloquent praises as to the virtues of gelatine, and bone broth, are also in remembrance, when the French chemists declared that, through its discovery, every two oxen, or sheep, were thereby made equal to three as human food, and that a bone, philosophically considered, was "a tablet of soup prepared by natures' own hand." Curry powder and brown paper, as preventing bodily cold under absolute famine and nakedness, come under the same list; but the question is too grave a one to admit of any further allusions of this kind. They are well-meaning, but serious mistakes.

Propositions of a benevolent spirit, sometimes founded on error.

The truth is, that the most important interests of society are involved in the settlement of these matters. The poor are more immediately interested in the result; but the middling classes, and the rich and dignified, are also bound up in it, though in a less direct manner, as all their lives and fortunes are so closely interwoven with those of their humbler fellow-men. But, laying interest altogether aside, the question reduces itself to one of good-taste and propriety—To ward off great public evils, when within our power, is only an act of justice, and therefore of duty, and I believe these evils to be so deeply and extensively

Importance of the question to the whole body of society.

Prevention of Disease an act of plain duty.

For universal effect there must be universal sincere effort, not detached or spurious agitations.

rooted, that there is no possibility of effectually overcoming them, except by the unanimous endeavours of the whole people, or of the government as their representative. And I further believe, that for these endeavours to have full and convincing effect, they must not be made by halves, and in a loose and partial manner; but in a combined and systematic spirit, embracing every exigency, in every quarter. This I advocate in no political spirit (as that term is commonly accepted) but simply as a social act of universal self-protection. The best interests of those unhappy persons who have most claim on our compassionate regard, have often been injured by the language and known opinions of those who advocated their cause. Such persons have too frequently mixed up offensive or unripe speculations upon general government, with the staple of their specific argument, and so aroused bitterness and suspicion, where otherwise there could have been no room, except for common-sense and christian feeling.

A social and not a political question.

The medical Faculty its proper guide.

I should rejoice to see the advocacy of such measures dropped by these parties, and taken up by authorities of such acknowledged weight as would command respect and confidence. The clergy feel and know themselves to be appointed guardians of spiritual health. The natural duty of the Physician is no less involved as regards that of the body. The medical profession, and the supreme colleges as its fit prolocutors, are the legitimate source of all such propositions for any good purpose; but to effect such ends, there must be unison of opinion and intention, and that disciplined organization, which one would wish to see realized, as it is already realized amongst the other learned faculties. The nationl Colleges of Physicians and Surgeons should certainly possess an authoritative and vital influence for all the purposes of public health. As a faculty, medicine has at present no special position in the legislature, so as to act with such authoritative effect: but yet there are ample opportunities afforded to it, by common law and privilege, to speak with a force and dignity, that would command respect and conviction.

National influence of the Faculty.

The Colleges must be at once acknowledged as the natural guides of sanatory legislation, so far as counsel goes; and, by the beneficient suggestions which they are capable of making, would earn public gratitude and immortal honour. The economical arrangement of the measures would be safer in other hands; but none could advise with equal fore-knowledge of fact, as regards the relation of man to the external world.

What the nature of their proposals might be, must be left to their own wisdom. I do not presume, as an individual, to anticipate, or even imagine, in the remotest manner, their specific form, or magnitude. But, their only object being the repression of disease, and the institution, to that end, of sounder modes of living amongst the masses of the population, the general scope of their influence has been already, in some degree, indicated in these pages. As to contrivances for warding off absolute starvation from the poor, I put these out of consideration, as forming no part of the strictly medical question. I take for granted the cheerful recognition of that generous legal declaration,—that no man shall owe his death to the want of bread, or medical

Recognition of a Poor-law taken for granted.

advice. With this admission, then, the Physician has only to consider the other sources of disease, and devise means of suppressing them. Whatever is traceable to geographical latitude, to meteoric influence, to distribution of land and sea, or hidden pathological laws, must be admitted as, so far, beyond his control. But, as to local drainage, and local ventilation, regulation of diet, clothing, cleanliness, and habitation, along with fuller enquiry into the causes of disease, all these lie fairly within his province, and so far, within his power. In any free country, it would be impossible to practise dictation, even for the peoples' good; but there are numerous public establishments, in which a consistent, and rational system of regimen and management could be enforced: nor could the general body of a nation, having the decidedly beneficial results of such rules constantly placed before them for contemplation, avoid the conviction of their utility, or refuse to adopt their principles.

Regulations for drainage, ventilation, building, etc., etc., Limitation of government inter ference.

To a certain extent we have some good illustrations of the point. In the first place, publicly, as regards the happy consequences of those changes made in the economy of armies, navies, and prisons, during the last half-century or little more. In the second place, privately, as in Benevolent Building Associations for erecting well-ventilated, and well drained habitations for the poor; in Soup Societies, where under medical, or, at least, scientific direction, the nature of the food is calculated to meet all the demands of the living system. In Clothing Clubs, where the wealthy have given their contributions freely, in order to augment the benefit to humble members whose comfortable appearance has enticed

Beneficial operation of already existing improvements.

others to join—in Temperance Societies, where for every one that has actually taken the pledge, at least one other has been shamed out of the habit of excess—in Cottage Allotment, and other such charitable societies, where the recipients of the benefits have shown such improvement in their physical and moral circumstances as has made them the envy of, or rather the example to, their neighbours; in the erection of public baths and wash-houses, the benefits of which are too obvious for comment, and in numerous other efforts of a like spirit, all duly appreciated by the general philanthropist.

It would be wrong to quit this part of the subject, without alluding specially to that well organized system of general encouragement to improvement which is exhibited in the operations of the great Highland Society. It would be impossible to estimate the amount of good effected, or evil warded off by these efforts. For every one that has gained a prize for improvements in the social arts, or industry, or cleanliness and comfort, numbers more have striven to deserve it: and so set an example to more and more, who may in due season run the good race. Such are the institutions deserving the advice and assistance of government in such degree, as to increase their field of operation, without throwing discouragement on private exertion.

Only objection the narrowness of their sphere.

These then, have had their distinct effects upon society; but their operations are comparatively weak and scattered. They all aim at one grand end, in order to overtake which they would require to act in complete unity. This might, and could only be attained by government interference; not the interference of indisputable dictation, but the interference

Legislation could extend their beneficent influences.

Guidance and encouragement apart from dictation.

Government mght hold out small bounties to better or more provident habits, without any loss.

The poor might be allowed to put themselves under the care of the wealthy with advantage.

Certain advantages in the Truck system when not abused.

of kindly encouragement in aid of private exertion. This might be done by bestowing certain donations as a premium to encourage the extension of such provident associations as tend to place the poor in a more comfortable position under non-employment or ill-health. It is my persuasion that such well-timed, or rather pre-ordered beneficence, would, under right judgment, be the means of saving much compulsory expense; at all events, it is worthy of consideration to the professed financier. Such an advising and directing—not dictatorial—influence is even of great use in guiding the judicious outlay of small incomes. It must have happened to the lot of most persons to have an opportunity of comparing the condition of that labourer who was paid in money, to his, who was kept in the house of his master, yet at really less expense. I have known farmers of benevolence who, shocked to see the misery of their workmen, have resolved to bargain for a part of their wages in clothing. I have known men of rank working their own mines, make the same stipulations. Such arrangements have been denounced, as a revival of the truck system, and as contrary to law and perhaps that may be true; yet one must confess that the state of the so-called victims of this violation of the Act of Parliament was better than that of their unfettered fellow-labourers. Railway, and other great companies have adopted the plan of fully feeding their labourers, so as to realize their entire capabilities of exertion, they have also clothed their regular officers like the police, and so far the act of Parliament is rendered a dead letter in practise.

In conclusion, I should be inclined to suggest

Duty of Government to aid private effort.

that, as numerous miasms are traceable to insufficient drainage—to crowding of human bodies—to want of ventilation, and deficiency of light and heat;—and, as the predisposition to infection is aided by deficient or improper diet, ill-clothing, and depression of mind, so is government called upon to aid and encourage, if it do not take the initiative in every effort made to remove the one order of causes or the other.

Certain special points enumerated and recommended.

I do not endeavour to indicate the practical details necessary to the completion of such improvements; I only attempt to draw the outline of principles. But there are many excellent and economical proposals that have emanated from persons of different professions, in connection with improvements in their own peculiar walks. These are well worthy of attention, as proving the possibility of removing many of the crying evils of large and ill-built cities, etc., without any great deterioration in the value of property, supposing new and better tenements cannot be raised in their stead. Such are certain ingenious methods of forming water-closets in the highest tenements, and draining filth into the common sewers, by means of kneed pipes, at a moderate cost—of ventilating sewers, by means of draught furnaces erected over their great openings—contrivance of cheap means of ventilation, and purification for old incommodious buildings—facile methods of disinfection and lime washing—inventions for consuming the smoke of large manufacturing towns—schemes for economizing the means of the poor by having common fire rooms, and common kitchens attached to crowded yet cold hives, as they may be justly called. Even these latter propositions, though somewhat uncertain, are still worthy of trial.

They might tend to good effects, if directed by good hands; and what is not evil, if undertaken with corrupt motives? There also can be no doubt, where infectious diseases prevail, that the prevention of the movement hither and thither of articles of furniture by sale, or otherwise, would effect signal service; nor is it unworthy of consideration how far the establishment of public halls for the reception of the dead, might he effected in unison with the natural feelings of humanity and family piety. As positive and horrifying facts, I may state that the lower order of landlords have frequently been known to drag beds for sale, from under the dead bodies of Typhus patients, and that these dead bodies have lain in those squalid rooms for days and days together, while a numerous family, under the apathy of despair, has eaten, and slept by their very side.

Present legislation partial as to public health.

So much has already been done in the way of legislation, as to drainage and building: but the efforts do not appear to be sufficiently systematic. There is not enough of enticement in the way of immediate worldly benefit, to enlist the full sympathy and co-operation of the poor themselves; and every one must be aware that it is only by some very obvious and immediate good, that their feelings can be impressed—incompetent as they are to weigh the more distant ultimate consequences. No understanding is so obtuse as not to perceive any little arithmetical advantage to its own benefit; and it is my conviction that some such step (as a first one) is the only means by which the masses of the population may be induced to combine, and economize their resources; so bringing about that better mode of life, and those orderly habits which most conduce

Necessity of very plain appeals to the poor.

to the maintenance of health. I am perfectly well aware that, if the whole regulation and expense of such a system devolved upon government, the money must needs be drawn from the common fund, and so fall upon poor as well as rich. Therefore I advocate no more, than that government should merely aid and encourage it by certain donations, guiding and directing all the operations to one end under due restrictions, and with medical counsel. Yet, whether governments think fit to interfere or not, (and it may be, that statesmen are the best judges of such a subject) there can be no doubt of what is the duty and real interests of society at large on these points, and statesmen also have proved their opinions upon the matter, by becoming, as private individuals, large subscribers to such funds.

Conduct of Statesmen in their private capacity.

Amount of the evils to be combated.

An estimate of the vast amount of suffering and mortality arising from Typhus, and Phthisis alone—both to so great an extent attributable to causes over which we have considerable control is, of itself, sufficient to incite our energies, and when we consider the long list of other morbid manifestations, of greater or less severity, of which only an indicative sketch has been given in a former part of this paper, and which, affecting particular callings, are all avoidable in a certain degree, by wise regulations, we are the more and more bound to offer some advice. I would especially rest the importance of that advice on the well-known national mortality arising from tubercular degeneration, confessedly so much attributable to influences on which we have, at least, some check. The deaths from pulmonary Phthisis alone, are equivalent to one fifth of the entire population; but, if we include all the forms of pure Scrofula, such as Hydrocephalus, White Swelling, etc., etc., they are found to be one third: and if we further add all those diseases, wherein there is a tendency to the tubercular type of action, as Typhus and Chronic Bronchitis, and Chronic Dysentery, then they amount to no less than one half, or just as many as from all other diseases put together. The use of Davy's safety lamp has been enforced as an invariable rule, and other safe-guards in other departments, are quite as much demanded, though their useful agency is not so obviously perceptible to the uneducated mind. The use of the Sulphuric Acid Syrup amongst lead workers has effected great good, though not universally employed. The lime juice, in long voyages, is appreciated now, even amongst the most ignorant; so that they even pursue their employers at law, in the event of their neglecting to provide it.

Use of Davy's lamp.

Other preventives are equally important, though less obvious to uneducated minds.

These few examples are merely adduced, to show that the most unenlightened persons may be brought to practise certain habits, under certain convictions, when proper means are taken by those above them to impress the truth upon their minds. We do not require to instil popular systems of physiology, or domestic medicine, (than which, amongst the ignorant, there cannot be greater curses.) It is only requisite that those, in whom the world reposes entire confidence, should lay down a few plain and dogmatic rules, to be practically carried out under a fitly organized system. There are medico-legal boards of public health in other countries; nor do I see how it should be impracticable amongst us, even with all our personal freedom. Doubtless the public mind is, at present, much shaken in many matters by the prevalence of conflicting doctrine;

Their cheerful adoption by the masses, when properly introduced.

Differences even in Medical opinions.

Medical tribunals might reconcile them.

but I conceive that opinions—cautiously matured—and emanating from the representative corporations of the profession would, in a great measure, settle such a state of things, and re-invigorate the public confidence.

Modes of inquiry into the hidden origin of disease.

These general observations suffice to elucidate the principle proposed for adoption as regards those diseases, of the origin and nature of which there can be little doubt. At least we know in a great measure the usual conditions of their induction, and so, if we please, can take steps to arrest their rise and progress. There are others, however, of a still more mysterious character, that require thorough investigation, that is to say, investigation of the most minute, extensive, and persevering kind. I allude, more particularly, to cancer and other malignant deposits; yet the modes of inquiry which I should feel inclined to suggest for them are also applicable to every morbid change to which the body is subject. I do not think I overstep truth, when I venture to say that the bulk of pathologists, or at least morbid anatomists, have more bent their attention to what has been the final result of disease, than its commencing, or primary cause; nor is it necessary to add that the last question is by far the most important of the two. Dead bodies are daily examined, and the last consequences of morbid action duly reported; but we have too few instances of that unravelling spirit, which goes back, stage by stage, until it reaches the minute source of what is, at last, a gigantic and mortal lesion. It is certain that if the first, perhaps almost invisible impulse, had been warded off, none of its ulterior results could have followed. It is, therefore, highly desira-

General tendency to look for result of disease.

Chief object of discovery, its primary inductive cause.

ble that the attention should be strongly, and irrimoveably fixed upon what may appear to be the trifling, and scarcely sensible, commencement of diseased action.

Spirit in which the inquiry should be conducted

Yet, while the attention is so bent, it should not be over excited by any restless spirit of discovery; but chastened, and held in check, by that philosophical scepticism, which is the fruit of modesty, and sound judgment. This is a duty incumbent upon all—a duty which, so far as it has been practised, has led to many important conclusions; and which, if universally practised, would lead to many more. This, of course, includes a study of the natural history of disease, and, it may be, experiments upon animals as to the chain of consequences resulting from trifling irritations, or continued congestions in all their gradations and phases. It also involves an inquiry into the means of spontaneous, or natural cure, and a close pursuit of those stages or degrees of degeneration, that successively follow upon repetitions of injuries, or attacks on the same organ, or tissue, or portion of tissue. This may be, and has been, carried on very successfully by individuals, in private practise, in whom zeal and a penetrating genius have often sufficed to effect more with limited opportunities, than greater opportunities have afforded among the more careless.

Natural history of disease as to its rise, progress, and spontaneous cure.

Opportunities of detecting the incipient commencements of disease to those who have charge of large establishments.

But, undoubtedly, such enquiries are chiefly to be made by those who have large bodies of persons under their daily care, and who, by a comparison of observations, are enabled to elucidate and establish relationships hitherto unsuspected. Statistical reports serve us in a great degree; but they are only facts, and not reasonings. They also sometimes display manifest anomalies and contradictions, which show that the apparent cause of diminution or increase is sometimes a mere accidental coincidence, and not an efficient or specific promoter. Statements of simple result have their due use; but these, in many cases, have been multiplied beyond measure, without leading us one step nearer to the desired truth, inasmuch as, if the facts be misunderstood, they must, of necessity, be erroneously classified; and so jar with other tables of a similar kind, emanating from other quarters. All the affections that are set down as tuberculous, or cancerous, or of any other character, by this or that observer, are not to be accepted as positively such; except the character of his mind be already known, or the reports themselves exhibit proofs of correct reasoning fit to inspire confidence. If every dead body, without exception, were examined, under the control of a responsible public officer, medical statistics would then be what they ought to be, pictures of the truth, and medicine as a science would be founded on a basis, such as it cannot as yet boast of, but which would prove as great an encouragement to individual skill, as it would be a discouragement to ignorant pretension. The adoption of such a course, would meet all the evils I have pointed out. Without such an investigation, indeed, we know not, in any given case, what may have been the real cause of death: although in the knowledge of that cause, our hope of preventing future deaths, entirely consists. It may have proceeded from positive maltreatment on the part of attendants—from culpable negligence in following out medical orders—from the preventible public or private nuisances already al-

Ordinary Statistical statements often fallacious.

Proposals of an enlarged autopsical basis of inquiry.

Its absolute necessity in ascertaining the cause of death.

luded to in this essay—nay, from malicious poisoning, skilfully applied, while on-lookers were satisfied by the facts of a case so bad in itself, that the medical adviser doubted recovery. In short, I shall be bold enough to say that in cases innumerable, the usual public form of medical certificate, wanting the confirmation of an actual inspection, is no guarantee whatever of a lawful death. But, desirable as the proposed plan may appear in the abstract, I am not unaware that it might at first prove repugnant to delicate minds. I shall even make free to confess, that I myself am strongly inbued with a prejudice against that act, which looks like a proceeding of impiety towards the bodies of those friends and relatives who may be dear to us. I would not willingly permit my own parent, or wife, or child to be thus handled. Nevertheless, while my inborn prejudice is thus strong, I would not permit it to cloud my reason, or stand in the way of the general good. The highest personages of the realm have had their bodies examined for full satisfaction. Particular parents, who have lost, one after another, all their children, must feel that in proportion as their morbid conditions were submitted to the actual inspection of the attendant, so must his ability to effect a cure in others have been increased. In like manner, an universal system of enquiring into the state of the bodies of all the dead must needs have a beneficial effect on all the living to a degree that is scarcely to be estimated. A deep spirit of philosophy should undoubtedly guide all such proceedings; otherwise, they would tend to nothing more than a mere collection of dead records, without principle or purpose; but, this presiding spirit

Anticipated objections.

Objections met.

Happy results to be expected from its adoption.

being granted, it needs no very penetrating genius to foresee that the Physician's offices would by and bye become more and more applied to the prevention than the cure of disease, and his skill be less employed in checking positive organic ailments, than in improving the general condition of the constitution, and labouring to increase the number of fair impresses of the primitive type, by wise hygienic measures. What is wanted, indeed, is, not so much a repetition of unconnected occurrences, as a sober and searching investigation into the connection of symptoms with changes in structure, and a diligent unravelling of link beyond link of the morbid action, with a view to arrive at remoter so-called ultimate facts than we at present possess, and which, thus founded, and thus fortified, would become the established canons of Physic, impeachable neither by ignorance nor sophistry, the two natural enemies of Medical and all other philosophy.

Reasoning wanted as well as such statements.

Most men now believe that a vast many, even of those purely nervous symptoms, which are often the apparently first beginning of protracted and fatal disorders, owe their induction to previous minute changes in the circulating fluids, brought about by other agencies from without, chemically effecting certain alterations. Now these are worthy of the closest examination, and it were desirable, pending the establishment of the universal measures above proposed, that to every hospital or other public institution, there should be attached some one qualified to institute minute experiments upon the blood, the secretions, and the various discharges in every stage of disease, in order to detect, if possible, those lesions of affinity to which the manifestation of certain subjective symptoms owe their origin.

Disease generally of a material origin.

Usefulness of an analytic Chemist of great nicety attached to every great Hospital.

Probability of chemical analysis settling speculative opinions.

Medical disagreements further stated

An extended comparison of observations and conjectures would, doubtless, under such circumstances, lead to something very important; especially if clashing statements were immediately subjected to the scrutiny of some competent and responsible tribunal. It may be remembered what a protracted and sharp dispute occurred betwixt Professor Gluge, and some other pathologists, regarding the fatty deposit of certain kidneys; the one maintaining the oleaginous nature of the transformation, whilst the others denied it. A great deal of deep argument was used, and there was much appeal to the microscope; but none of them thought, as has been remarked by Dr. Christison, of resorting to the chemical test, by means of an Alkali. When this trial was suggested, it settled the question at once. Under a systematic order of enquiry, such strange absence of mind would be less likely to occur. It is a matter, indeed, of constant experience, that very opposite doctrines are often inculcated by different schools, each founding its peculiar opinions upon what it advances as ascertained and established facts, demonstrable by arithmetical computations, and the full array of statistical tables. Each of these schools may be of equal respectability, and all their champions men of learning and honor—yet opposite they are, in statements of fact, as well as of opinion. This prevails, to a still greater extent, amongst the ranks of private practise; so that the differences of Doctors have been indicated by a popular proverb.

Philosophical minds can reconcile them.

Men of very enlarged views, whose profound penetration and subdued sensibilities are more peculiarly adapted to the walks of philosophy, can generally manage to reconcile those differences, and mould them into additional evidences of the real truth.

They take into consideration many attendant circumstances, which the narrower or more excited observer had overlooked; and, by so doing, demonstrate that there are fewer exceptions to general laws, than many might at first imagine. They perceive that the apparently conflicting reports of hospitals, and of individual physicians, (upon only one of which reports certain rash disputants sometimes proceed to establish absolute and invariable rules of treatment,) are brought into unison by inquiring further into the comparative wealth or poverty of the district, or country,—its closeness or openness—its food being of this or that nature,—its temperate or intemperate habits,—any temporary meteoric influence that may have prevailed at the time, and many other matters of more or less importance which it is unnecessary to enumerate. The consideration that heat, or cold, or moisture, or dryness, may induce a modification in the features, and therefore in the treatment of a disease, no more proves its non-identity, than the non-identity of a chemical agent is proved by its being soluble in a hot liquid, but not in a cold one, or uniting with another body under the electric stimulus, but not without it; or because it changes its external appearance and qualities in the presence of other powers. In regard to such conflicting reports, no better example can be brought forward, perhaps, than that which is exhibited in those of such very eminent physicians, as Laennec and Louis, touching the comparative frequency of tuberculous deposit in the left or the right lung. I do not doubt but that both were perfectly correct in their facts; though both of them could not be correct in two opposite conclusions. The source of fallacy lies in too hasty a generalization. Each, let us say, might have examined 3000 cases,—and while the one found 2000 out of the 3000 affected on the right side, the other might have found exactly the contrary, Now, every one will admit that it would be quite unreasonable to draw an universal inference of proportion, because out of three patients he had found two affected on one side or other; yet what applies to three individuals, equally applies to 3000. Conjoin the two bases of calculation, so as to make 6000, and the truth is found in the mean. In short, before we draw universal conclusions, we must possess, in some sort, a universal experience, either through ourselves or others. General inferences are like colums, very unstable, unless their foundations be proportionate to their altitude. But although these seeming anomalies can be readily reconciled by professional, or even non-professional men of well-balanced minds, such conflicts of hostile principles tend very much to stagger the judgments of the vulgar, and shake their confidence in the whole faculty.

But the vulgar only feel their confidence in the whole faculty, shaken thereby.

Medical differences a great public evil.

This, it must be admitted, is a serious evil, injurious alike to the profession, and the country: and every honourable man must desire to see it otherwise. Not that I advocate any interference, however slight, with private persons, or private opinions. I believe the free growth and expansion of the human mind to be so great a good, not to say so inalienable a right of nature, that no greater good, or higher right could be cited as a reason for its discouragement. Such free growth and expansion, therefore, must be permitted to every individual as a universal privilege, even although it should, as

Yet private opinion is a sacred right.

it does occasionally, lead to the production of nothing better than some huge pyramid of untruth, as a monument of perverted intellect. Even these however, are scarcely ever unmixed evils. Such structures could not be raised without some beautiful dove-tailing, or adaptation to each other, amongst the facts or conjectures that constitute their parts, and even after their false foundations have been removed, we can often pick out innumerable valuable analogies from among the ruins. Any one can verify this by dipping into the works of the most heterodox physicians, not excepting even that Prince of Imposters, (as he has been severely called,) Paracelsus himself.

But public officers are in a responsible position.

But the opinions and acts of the proposed public officers of health, in their official capacity, would come under a very different category. They would be in a ministerial position, and responsible for the soundness of their principles to the powers that might appoint them. From the higher qualifications required from such functionaries, and their more extended offices, they would of course, as a body, be a superior order of men to the present parochial staff, whose place they would supply; yet many of whom, individually, might be advantageously drafted into the ranks of the new order, with increase of emolument and respectability, as accompaniments of their increased usefulness. But, excluded as they must be from private practise, they would be altogether dependant on the central powers, and responsible to them for the correctness of their returns, and the propriety of their measures. Such power being central, and removed from all local prejudice, the medical officer would be placed in a position

Proposed constitution of a new Public Sanitary body.

becoming his professional dignity, and not afraid of losing his office because he might follow the dictates of justice and humanity, and order the adoption of such plans as might offend the selfish or the ignorant. Judged, when supposed in error, by his fellow-labourers in the great work—though as fellow-labourers far above him in position and power, he would feel the same confidence in their verdict, as a Clegyman, or a Military or Naval officer feels in a court martial, or court ecclesiastical. Certainly it would be better for them and all parties, if they were thus answerable, not to any uninformed and variable authority; but to some thoroughly competent tribunal, so constituted as to command the entire confidence both of the public and the profession.

The prospective nature of authoritative medical tribunals, their functions, and officers

From the deliberative wisdom of such a body or bodies, acting with unity of spirit and purpose under the Crown, might emanate the grand principles, though certainly not the details of medical management as applied to all those public arrangements for maintaining and improving health, which have already been discussed in this Thesis. I advocate no such interference with private practise; but leave that to be influenced only through the moral weight which a body, so constituted might acquire through the dignity of its objects, and the judiciousness of its proceedings. From the same source, by a fusion of the functions of the Registrar General, might issue the papers of returns, or statistical reports, the tabular columns so strictly and uniformly arranged, as not to admit of any erratic deviations from fact, or distortion, or misplacement of figures, or any such fallacies, as I have shown do now beset our present mode of death registration. To such bodies, might all important differences of opinion among the public officers, be safely referred for settlement. Their decisions would have real weight and throw a wholesome discouragement in the way of those wild and rampant growths already alluded to, that sometimes not only deform the garden of science, but diffuse the seeds of disease and death throughout the body politic. I believe that the active existence of such authoritative tribunals (which might be improved and magnified resuscitations of our more ancient Institutions,) but, which at all events, should consist of members learned in human history, and in those physical and moral sciences which illustrate the constitution of man, in its relation to the external world, would materially tend to exalt the power and public influence of the medical faculty; and, from the high and benevolent principles that have ever characterized that faculty, its exaltation could only be concomitant with the increased happiness of mankind in general.

The probable results of their active agency in exalting the general influence of the profession, and benefiting society at large.

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